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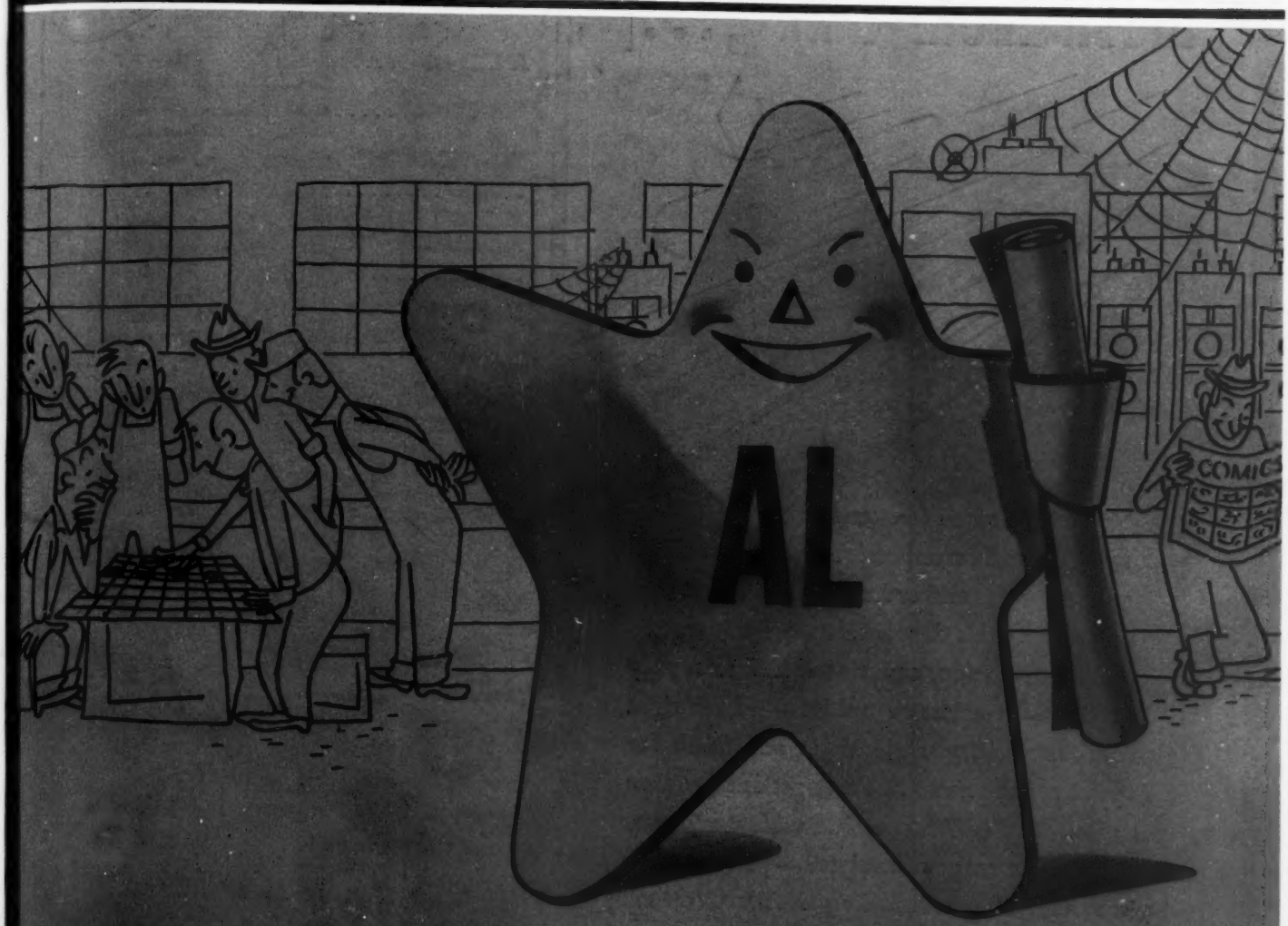
STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

EDITORIAL INDEX, PAGE 39



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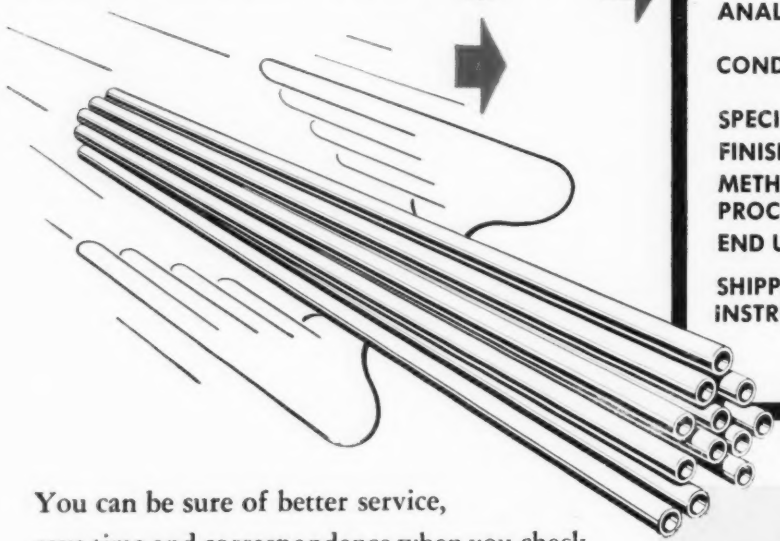

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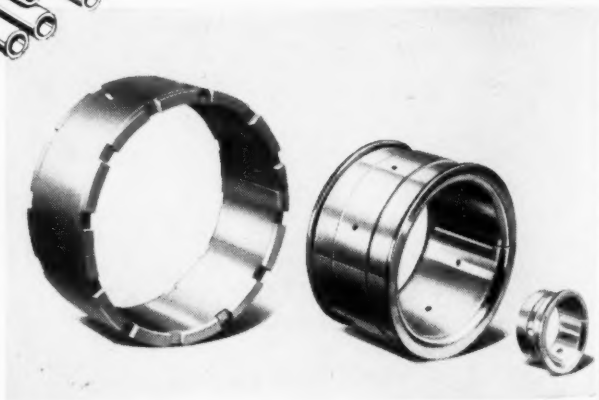

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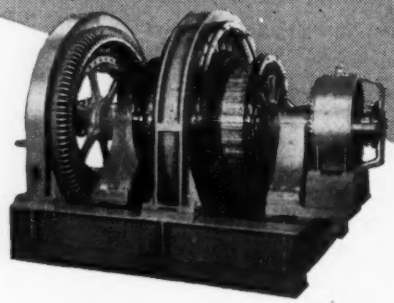

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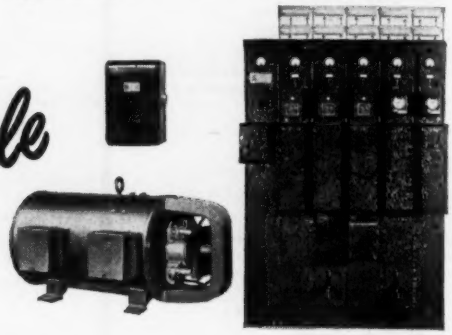

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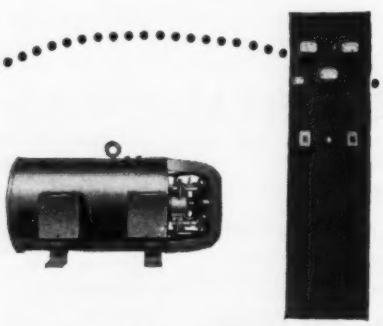

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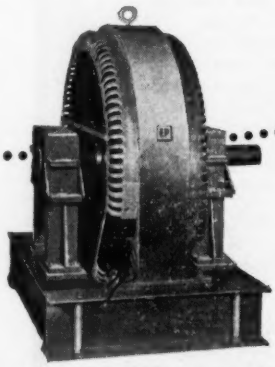

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Wages and Work

Last week in Pittsburgh leaders of the CIO United Steelworkers voted unanimously for "a substantial wage increase" when negotiations covering the wage rates for approximately 650,000 employees get under way in April. President Philip Murray declared that the steelworkers are in an "excellent bargaining position" because recent price increases and attractive profits should make it easy for employers to grant wage increases. He also repeated the old argument that employees need higher wages to compensate for higher costs of living.

If these pronouncements are a fair hint of union strategy, then it would appear that CIO is discounting the effect of the recent break in commodity prices and is clinging to its original position that higher wages are justified on the basis of needs to combat living costs and of the employers' ability to pay. In the third round of wage negotiations, as in the first and second, there is no disposition on the part of union spokesmen to discuss the factor of worker productivity.

This is rather odd, because the promise or the hope of even a slight increase in the output of a worker per hour would be a much more potent argument for a wage increase than any other that union negotiators could bring to the bargaining table. Dr. Alfred P. Haake, industrial consultant to General Motors Corp., brought out this point effectively to a Cleveland audience last week when he said, "It isn't alone the hourly wage paid labor that skyrockets prices. It's what labor produces for that wage that lowers or raises prices."

Dr. Haake went on to point out that in 1946 the unions in several large industries asked for 30 per cent increases. While increases somewhat under that figure were granted, the low output per worker made it necessary to increase prices. But if the workers in 1946 had been willing to turn out as much work per hour as they did in 1941, they could have asked for and received a 50 per cent increase in wages and employers would not have been forced to increase prices.

Sooner or later unions must come around to the cold fact that wages should bear a closer relation to the amount of work performed.

* * *

STEEL NEEDS IN 1948: Inability to get enough flat-rolled steel is a major problem in the metalworking industries. For this reason, the editors of this publication have made an exhaustive study of the subject and have packaged their findings in a concise, 8-page article in this issue.

In it will be found discussion of the basic factors contributing to the shortage; a tabulation of returns from representative consumers showing how much steel they needed in 1947, how much they actually received and how much they expect to need in 1948; shipments of sheet and strip from 1937 through 1947; a directory of producers of sheet and strip with existing capacities and capacity now under construction; and other pertinent information.

The returns indicate that only 31 per cent of consuming companies obtained sufficient flat-rolled steel in 1947, that 69 per cent reported shortages averaging 37 per cent of requirements and that 60 per cent expect to need more tonnage in 1948 than in 1947. The indicated demand for 1948 is exceptionally high—so high, in

(OVER)

AS THE EDITOR VIEWS THE NEWS

fact, that steel mill analysts believe it is exaggerated.

Of course demand will be governed somewhat by the economic conditions prevailing throughout the year. Consumers based their estimates on the outlook for 1948 as it appeared in January. If activity continues throughout the year at or near present levels their estimates may turn out to be fairly good. But if the recent break in commodities is followed by other adjustments, their estimates could turn out to be fantastically high.

Meanwhile, new capacity is coming in which, sooner or later, will ease the situation. —p. 55

* * *

PITFALLS IN T-H LAW: Many employers who during the coming weeks will be considering the third round of wage increases demanded by unions will be confronted with something more formidable than another hike in labor costs. For the first time, they will be brought face to face with the realities of the Taft-Hartley Act.

They will find that this new law imposes serious obligations upon management and that even among the experts there are wide differences of opinion as to its interpretation. An additional complication is the certainty that much of the present confusion and conflict over the meaning of the law will not be cleared away until the disputed issues have been settled in the courts.

The point is that employers cannot afford to dismiss the Taft-Hartley Act lightly in the belief that its main purpose was to restrain labor unions. It works both ways and there is dynamite in it for unwary management. —p. 48

* * *

GYPPING THE PUBLIC: Speaking to Cleveland members of the American Society of Tool Engineers, Clay P. Bedford, vice president in charge of engineering of Kaiser-Frazer Corp., made a strong case against existing tax laws as serious hindrances to engineering progress.

He declared that the two major factors considered in contemplating a changeover to new and better ways of manufacture are, first, the initial cost of new equipment and, secondly, the loss to be absorbed on the equipment replaced. "All too often," he said, "this second factor determines whether new methods—regardless of their efficiency—can be adopted at all."

This is because the old machinery must be carried on the books at many times its real value. It must be carried at these grossly inflated values because of existing "short-sighted depreciation and amortization requirements of our tax laws."

In short, these tax laws are gypping the public, because they are retarding progress that would enable industry to produce more goods at less cost for more people. —p. 88

* * *

TAX RELIEF OVERDUE: Some day, and we hope it is not too remote, the American public is going to rise up in its rightful wrath and call a halt on exorbitant taxes. The spenders in public office are riding for a fall.

American Iron & Steel Institute figures that from 1935 to 1946, inclusive, the steel industry paid $3737 million in taxes, whereas its profits during the period were only $2243 million. Last week mayors of metropolitan cities were trying to figure how they could increase their "take" on local taxes by invading fields the federal government has pre-empted since 1933. Concurrently the District of Columbia is imposing a "franchise tax" on companies doing business in the district.

Reform in taxation—federal, state and local —is long overdue. —p. 64

* * *

CANADA'S PREDICAMENT: Canada last year invested $2300 million in buildings, machinery and capital improvements. It is estimated that in 1948 $2700 million will be spent in this manner.

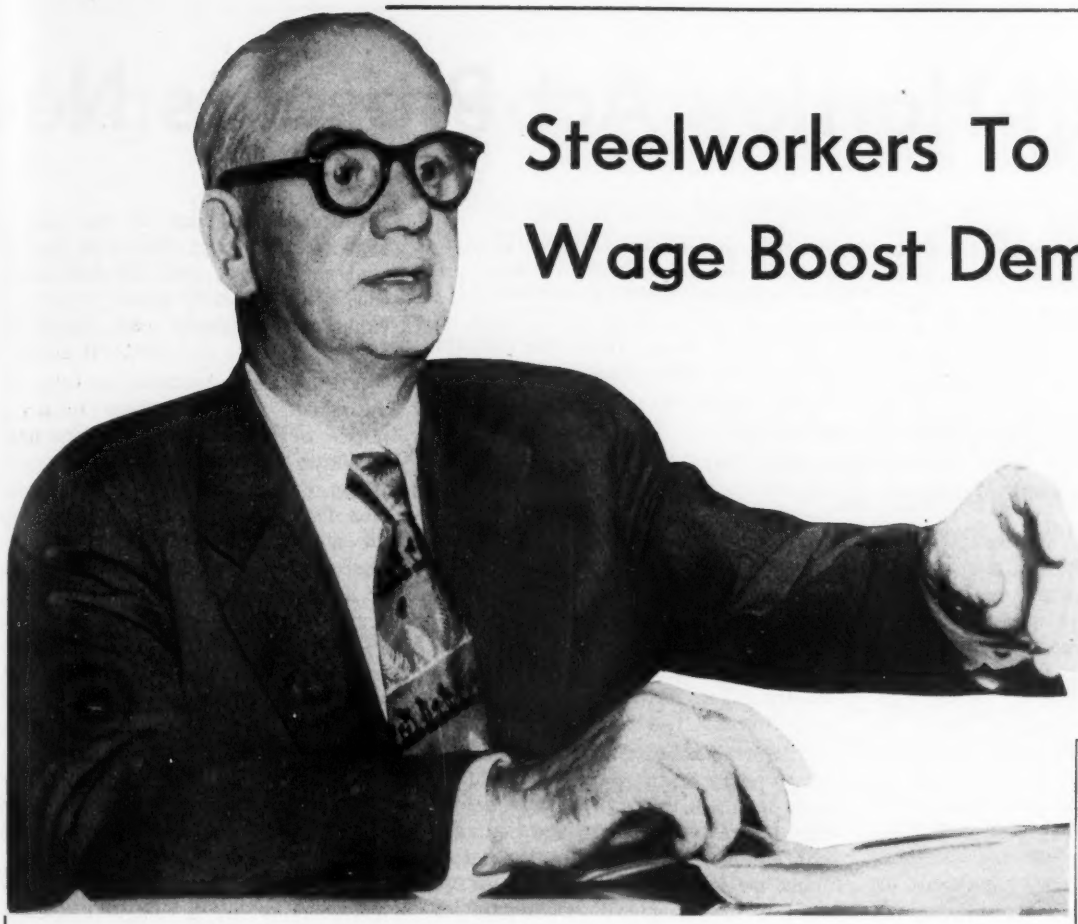
While this gain of 17 per cent is gratifying in most respects, the increased investment is an important contribution to Canada's shortage of United States dollars. For this reason, says C. D. Howe, Canadian minister of trade and commerce, investments in capital improvements must be controlled on a selective basis. Inasmuch as "every dollar spent on construction involves some 30 cents in United States exchange," priority will be given to projects which tend to conserve United States dollars or to earn more United States dollars.

This policy is gaining ground in other nations confronted by a dollar shortage. It means that efficient machinery and equipment probably will not be affected too seriously by emergency trade restrictions. —p. 67

E. L. Shaner

EDITOR-IN-CHIEF

Steelworkers To Press Wage Boost Demands



STEEL February 23 1948

Union pledges adherence to "no strike" contract regardless of outcome of negotiations. Will argue wage case on basis of increased living costs and industry's ability to pay

Philip Murray, above, president of the United Steelworkers and the CIO, insists workers need wage increases, industry can afford them. Recent commodity price drops—"A lot of speculative baloney"

UNITED STEELWORKERS will press for a "substantial wage increase" this spring, despite the recent drop in commodity prices and in cost of living items at retail.

Negotiations between the union and the United States Steel Corp. are expected to get underway in Pittsburgh Apr. 5.

The union has announced its intention to adhere strictly to its "no strike" contracts with the industry regardless of the outcome of the wage negotiations.

The amount of the increase to be asked will not be disclosed until negotiations start.

These were the principal developments of the meetings of the union's executive board and wage policy committee in Pittsburgh last week.

Union officials indicate they do not intend to attempt to force the Big Steel wage agreement on the nonbasic steel companies—those which have contracts with the United Steelworkers but which do not produce steel. The union executive board will meet in Pittsburgh Mar. 25 to consider demands against the nonbasic steel companies.

Position Unchanged — President Philip Murray said the union's position on wages remains the same as before the commodity market break. That position is that the union wants an increase to compensate for increases in the cost of living and because it believes the industry can afford to pay. Murray asserts steel price increases since last October will result in more than $220 million additional revenue to producers.

The union chief says he "attaches no special significance" to the recent sharp drop in commodity markets.

The contracts between the steel industry and the union generally run for two years, with a provision that they may be reopened this spring for consideration of wage changes only. This appears to eliminate fringe issues from this year's negotiations. The union will attempt to bring social insurance into the discussions, although this need not be negotiated under terms of the contract. Should no agreement be reached on wages by the end of the specified negotiating period—Apr. 30 in the case of U. S. Steel—the contract continues in effect until Apr. 30, 1949.

Average $1.565 Per Hour—During December, latest month for which figures are available, steelworkers averaged $1.565 an hour for an average work-week of 38.6 hours.

For all of 1947, wage earners in the steel industry made an average of $1.513 an hour, compared with $1.347 in 1946 and $0.818 in 1937. Payments to wage earners totaled $1,594,680,000 for the year, one third more than the 1946 payroll of $1,208,259,000, and double the prewar peak 1937 payroll of $804,721,093.

Total payroll, for wage earners and salaried employees, was $1,986,661,000 in 1947, an alltime record.

Taft-Hartley Act Presents New

THIRD ROUND of pay hike demands which unions will make during the next few weeks will confront employers with more than a labor cost problem. For the first time management will be brought face to face with the realities of the Taft-Hartley Act. Press and radio comments on the new labor law spotlighted bans on the closed shop, featherbedding and union-administered welfare funds.

But that isn't the whole act—not by a long shot. The fact is that the act does impose restraints on labor organizations—but it also imposes a number of serious obligations on management. Just to give you an idea: A compilation of union contract clauses published by the U. S. Bureau of Labor Statistics lists more than a dozen different types of checkoff clauses in use in contracts today. Yet, the Taft-Hartley Act prescribes certain limitations on the checkoff arrangement which may be made by the employer, employee and union. An employer who willfully violates this section of the new act may be guilty of a misdemeanor and subject to a fine of more than $10,000 or to imprisonment for not more than a year, or both. Consequently every existing checkoff clause will have to be reexamined, and probably rewritten.

The Taft-Hartley Act is sprinkled throughout with similar examples of legal nicety and practical nuisance. Every company that is about to negotiate a renewal, modification, or extension of its present union contract must put itself on notice of the pitfalls in the new act before signing on the dotted line.

Clarification Awaited — Confusion and conflict over the meaning of the Taft-Hartley Act is to be found at every level of union, industry, and government administration. Of course, a good deal of this fog will be cleared away once the courts get down to the business of interpreting the new provisions. But employers can't wait for judicial interpretation.

Two weeks after passage of the Taft-Hartley law John L. Lewis signed a contract with the coal operators. When terms of the agreement were announced, Representative Hartley, co-author of the new law, burst into print saying some of its provisions were prohibited by the statute. Senator Taft countered with a statement in which he practically said no, the contract is okay. With the parents of the new baby unable to identify their offspring, what are your chances?

By GEORGE MOSKOWITZ
Director, Labor Relations Section,
Research Institute of America

Sixty Days' Notice — Considerable argument already surrounds the 60-days' notice required by the law. This question often has risen: When does the 60-day period start? The law provides that no party to a collective bargaining contract covering employees in an industry affecting commerce shall terminate or modify the contract before taking the following four steps:

1. Serves a written notice on the other party of the proposed termination or modification 60 days before the expiration date. If the contract contains no expiration date the notice must be served 60 days prior to the time of the proposed termination or modification.

2. Offers to meet and confer with the other party to negotiate new contract or a contract containing the proposed modifications.

3. Notifies the Federal Mediation & Conciliation Service within 30 days after such notice of the existence of a dispute and simultaneously notifies the state mediation agency if no agreement is reached by that time.

4. Continues in full force and effect, without strike or lockout, all the terms or conditions of the existing contract for 60 days after the notice is given, or "until the expiration date of such contract, whichever occurs later."

Existing contracts are affected by the 60-day notice provision in a variety of ways. The variation depends upon contract language. You will understand how the provision works if you bear in mind the purpose of the section to set a 60-day period in which the parties can discuss their proposals without an immediate strike threat. Here are some typical situations:

1. Suppose a contract expires on a definite date and neither party gives notice of an intent to change the contract 60 days before that expiration date. What happens after the expiration date? Can notice be given at any other time? Consensus is that the contract remains in effect indefinitely—until one of the parties asks for a change. Terms of the old contract control until 60 days after the notice is finally given. Until that time neither party can resort to strike, lockout, or unilateral change.

2. Suppose a contract contains an automatic renewal clause requiring notice of an intention to terminate 30 days before the specified date. When must notice be given? The answer depends upon what you want to do with the existing contract. If you don't want to make any changes or terminate your present contract, then, of course, you won't give the 30 days' notice, but will let the contract automatically renew itself. But get this clear. If you don't give the 30-days' notice required by the language of the contract and the union doesn't give a notice, then you'll probably be bound to a renewal of the agreement as it stands for such period as the contract specifies.

3. Does the 60-day notice requirement apply to a wage reopening clause which permits reopening on a specified date? It would appear to apply if any bargaining at all is involved. If the provision merely calls for the application of an escalator clause, the change is automatic without notice. However, if the clause itself sets forth a notice provision, it must be followed. For example, if the contract merely says that it may be opened for wage negotiation on a certain date and you want to make a change, safe procedure would dictate giving notice 60 days before the date specified. The same would apply to any notice required of the union.

Left-Wing Unions—Communist or left-wing unions raise another problem for many employers. The National Labor Relations Board and its general counsel have been slowly picking their way through the statutory labyrinth that Congress set up for the Communist leadership in trade unions. But businessmen, industrial relations counsellors, and personnel directors need to know the way through this maze now. In effect, the Taft-Hartley Act bars the use of NLRB machinery in election proceedings and in unfair labor practice cases to unions whose local and international officers fail or refuse to file affidavits stating that they are not Communists. What does this mean to employers, particularly those dealing with the United Steelworkers-CIO,

Wage Contract Problems

The Taft-Hartley Act has raised some tough problems for employers about to negotiate new labor contracts with their employees. Employers must act on them now, even though administrative or judicial interpretations may not be forthcoming for months or years. Here are some samples:

1. **Does the 60-day notice provision apply to an existing contract? Who must give notice? When does the time start running?**
2. **Does an employer have to bargain with a union which hasn't filed the non-Communist affidavits required by the Taft-Hartley Law?**
3. **Does the third round of wage negotiations affect the closed shop or maintenance of membership provisions in present contracts?**
4. **Has the Act affected the automatic renewal clause in present contracts?**
5. **Can an employer agree to a checkoff of union dues which will be good for the entire term of the contract?**
6. **Can an employer legally notify employees of their right to withdraw from the union under an escape clause?**

United Electrical Workers-CIO, and the United Mine Workers-independent. These are the three big powerful international unions which have refused to file the affidavits required by the statute.

To deal or not to deal with unqualified unions? Many employers face this question. Sometimes, they know the union, though barred from labor board machinery, actually represents a majority, and that failure to renew a contract or negotiate one may mean a costly strike.

Confounding the confusion on this issue are two NLRB policies, which appear to cancel one another out. There is the established rule that majority representation, not formal NLRB certification, is the vital factor which determines an employer's obligation to bargain with a union. Pitted against this is the board's recent ruling that it will not certify a union which hasn't filed non-commie affidavits.

The average employer must ask himself: How much loyalty does the union command among the employees? If it lacks a majority, dealing with it is illegal in any event. Faced with a majority, then:

1. Find out why the international or local has not complied. Some internationals such as the CIO Steelworkers and the United Mine Workers want to test the law in the courts. They are not leftwing. But some unions have not filed for fear of investigation.

2. If only one union is involved and it's a newcomer at your plant, you can agree to a poll by an impartial person or agency to determine its majority standing. This may turn out to be a good deal less costly than a recognition strike.

3. If you are now under a contract with non-complying union, it's safest to continue carrying out the terms. The union may not be able to bring a refusal-to-bargain charge, but there's nothing to prevent it from suing for breach of contract in the courts.

4. If a contract with a non-complying union has expired and you are negotiating a new one, breaking off negotiations doesn't seem to make good sense unless you have a reason to believe that it no longer commands support from a majority of the workers.

5. If another union appears to be signing up your workers with an eye to demanding recognition, you might insist on formal NLRB intervention to protect yourself.

Discharging Communists — The Communist problems can tie you up at all stages of the game. For instance, can an employer fire employees merely because they are Communists or fellow-travellers? The answer to this in large measure depends upon whether you have a union contract or not. An employer who is not operating under a collective agreement can fire for any reason or no reason—except for union activities or union membership. A unionized employer can fire only within the limits set down by his contract. In most cases this means only "discharge for cause."

Keeping Workers Posted — One thing the Taft-Hartley Act does seem to settle in favor of management. It appears clear that an employer may tell his employees what rights they have under the law as it now stands. This is part and parcel of his right to speak his mind on unionism and particular unions—provided his statements contain no threats or other coercive remarks. For example, an employer can now advise his workers that (a) they may refrain from joining a union unless there is a legal union or closed shop; (b) may not be discharged at union request except for nonpayment of initiation fees or dues; (c) may seek decertification of the union if 30 per cent of the employees co-operate in the signing of a petition.

Union Security—The Taft-Hartley Act has outlawed the closed shop—at least in all new contracts after Aug. 22, 1947. Employers may, if they so choose, negotiate a union shop contract. This provision of the statute has really turned out to be a boomerang for most employers. Management willing to grant a union shop can't get a contract signed, sealed and delivered until NLRB holds a referendum.

The union security problem is further complicated by state law variations on the federal union security theme. To date at least four states have adopted laws which differ from those of the Taft-Hartley Act. These

are Colorado, Kansas, New Hampshire, and Wisconsin. Until the boundaries of federal and state jurisdiction over unionization are marked out, discretion would seem to dictate these steps, if you're covered by the Taft-Hartley Act:

1. Don't grant the closed shop. The federal law prohibits it.

2. Insist that the union comply with both state and federal law if you are in a state which requires a vote before union security can be negotiated. It may be that the union will not be able to meet the more restrictive legislation.

3. Secure from the union a contract commitment that it will reimburse you for any damages suffered by executing the security agreement or discharging employees under it if it should be held to be illegal under state or federal law.

4. Provide for cancellation of the union security provision in the event it is declared illegal.

Checkoff—Heavy penalties imposed under the new federal labor law make it imperative that you know the rules on checkoff of union dues. Before you can deduct them from the workers' wages, you must get a *written assignment from each employee.* Moreover, the individual must have a chance to revoke his authorization at the end of a year, or at the end of the contract term, whichever is earlier.

You may want to write a contract for more than a year. What do you do about the checkoff then? Even if you make a long-term contract, including a checkoff, for a term longer than one year, the right of individual employees to withdraw the checkoff consent must be preserved. But the statute does not say that you must get renewals of authorization every year. You may continue deducting the dues even beyond the year until such a time as the individual exercises his right of revocation. Working out this kind of deal may be better for you than demanding new authorization each year. This would only put a fire under the union to conduct an annual authorization drive.

If your contract was made before June 23, 1947, and expires before July 1, 1948, you can carry out the checkoff without bothering about individual consent. You need worry about the Taft-Hartley Law only when the contract is renewed or a new one is negotiated. Where the checkoff was instituted before June 23, 1947, and extends beyond July 1, 1948, you may deduct dues without individual consent up to the latter date.

No-Strike Clauses — After Congress facilitated suit against unions for breach of contract, the first reaction of organized labor was "no more no-strike clauses." Instructions poured out of the mimeograph machines from every international to local unions advising rejection of any no-strike clause in future contracts. The primary union objective was to avoid damage suits authorized by the law. Nevertheless, compromise no-strike clauses are being signed despite AFL and CIO denunciation of the damage suit provision.

ROBERT N. DENHAM
General counsel of the National Labor Relations Board

For employers, the no-strike clause, even when it was unenforceable, was of real psychological value. It gave considerable certainty of undisturbed operations. Union leaders used such a clause to keep their own rank-and-file in line when workers pressured for strikes on minor disputes or where political demonstrations were sought.

In order to sell the union on the idea of the no-strike clause, you will have to draw a line of distinction between the authorized and unauthorized walkout. If a concession must be made along the lines of a damage suit waiver clause, that provision should exempt the union from liability only in the event of *unauthorized* stoppages, and then only on the condition that the union makes every reasonable effort to terminate the stoppages within, say, 24 hours; and publicizes to the workers that the walkout is without union approval or authority. If you limit union responsibility to authorized strikes, write into the contract your authority to discipline wildcatters, including the right to fire them. As an alternative remedy, you might also assert your right to substitute a specified fine or suspension.

Welfare Funds—In enacting legislation to restrict payments by employers to unions, Congress has complicated the problem for employers. In dealing with contributions to union welfare and pension funds, three different rules are applicable to the situation:

(1) The Taft-Hartley Act doesn't apply at all to funds established under union contracts before Jan. 1, 1946, except where the fund provides for pooled vacation benefits. In this latter case, company exemption applies if the fund was established before Jan. 1, 1947.

(2) The Taft-Hartley Act provisions do not apply to welfare funds or pension plans established under union contracts, between Jan. 1, 1946, and June 23, 1947, until expiration of the existing agreements but not later than July 1, 1948.

(3) The statutory provisions do apply to all new contracts entered into after June 23, 1947.

All this means that if you are negotiating a new contract this spring you will have to see to it that any welfare plan which is set up provides that all payments to the union will be held in trust for the purposes specified in the law—and only those purposes. You will also have to see to it that the plan provides for equal representation in the administration of the fund by company, employees, and some neutral person.

Retroactive Dates—One very practical phase of contract negotiation which receives little attention but which is full of dynamite is the dating of the contract. It takes time to work out a new agreement. Often terms aren't reached for weeks or months. Unions insist and often receive retroactive contracts. Dating back the new agreement to the expiration date of the old one has its advantages. It eliminates the pressure at the bargaining table, particularly on the employer.

Due to carelessness or lack of information, it too often is assumed that retroactivity applies only to wage increases and that disposition of back pay gets rid of all problems. Don't forget that weeks or months of negotiation may witness changes in personnel. If this happens, you may get into the problem of seniority, transfer rules, promotions, vacations, etc. This has turned out to be a costly mistake for a number of employers. Some arbitrators have given retroactive effect to all provisions of the contract. Avoid this by indicating which provisions are retroactive, which ones date from the execution of the contract; that only wage provisions apply retroactively and that all other provisions in the contract are effective as of the date the contract is signed.

Autos Lead as Steel Consumer

Distribution of finished steel in November shows little change in pattern, although shipbuilding, aircraft and oil and gas drilling receive increases

THE AUTOMOTIVE industry continued in November to be the monthly leader and also the leader for 1947 as a consumer of finished steel, figures compiled by the American Iron & Steel Institute, New York, show.

Also showing no change from October in their relative positions as consumers were construction and maintenance, containers, and rail transportation, those three groups being in second, third and fourth places, respectively, in receipts of finished steel during November. That order applies also for the first 11 months of the year.

The automotive industry, excluding tractors, received 723,515 net tons of finished steel in November. That constituted 13.8 per cent of the net total of 5,216,990 net tons shipped by the steel industry that month, and brought the auto industry's receipts for the first 11 months of 1947 to 8,029,342 net tons, or 13.9 per cent of the 57,418,811 total net tons of finished steel shipped during the first 11 months of the year. In October, the auto industry received 13.9 per cent of that month's total net shipments of finished steel.

As in October, warehouses received in November 16.7 per cent of the month's shipments. For the first 11 months their proportion was 16.6 per cent, unchanged from the ten months' figure for last year.

Exports constituted 6.9 per cent of mill shipments in November, while for the first 11 months they accounted for 6.6 per cent.

Showing gains both percentagewise and in tonnage over October were November shipments for the following three groups—shipbuilding, aircraft and oil and gas drilling.

Steel Distribution 11 Months, 1947

(Leading products, all grades including alloy and stainless)

Market Classification	Net Total (All Products) In Net Tons
Converting and Processing	5,189,718
Jobbers, Dealers, Distributors	9,578,734
Construction, Maintenance	5,675,649
Contractors' Products	2,035,698
Automotive, excl. Tractors	8,029,342
Rail Transportation	4,459,517
Shipbuilding	299,255
Aircraft	34,040
Oil, Gas Drilling	838,611
Mining, Quarrying, Lumbering	259,332
Agricultural	1,129,764
Machinery, Industrial Equip., Tools	2,840,656
Elect. Machinery, Equip.	1,469,194
Appliances, Utensils, Cutlery	1,446,484
Other Domestic, Commercial Equip.	1,542,721
Containers	4,615,103
Ordnance, other military	48,861
Unclassified	4,101,760
Export	3,824,372
Total	57,418,811

The 5,216,990 net tons of finished steel shipped in November included 337,955 net tons of alloy and 20,288 net tons of stainless. Consumer leading in receipts of alloy was the automotive industry, with 86,889 tons. Of the 337,955 tons of alloy, hot-rolled bars were the leading product, accounting for 135,379 net tons. Consumer leading in receipts of stainless steel in November was the appliances, utensils and cutlery classification, which accounted for 2933 net tons, followed closely by the automotive industry's 2898 net tons. Leading stainless product in November was cold-rolled strip which totaled 7473 net tons.

Steel Shipments in 1947 Gain 29.4 Per Cent

Net shipments of steel products in 1947 amounted to 63,138,659 net tons, 14,363,127 tons or 29.4 per cent more than were shipped in 1946, American Iron & Steel Institute reports.

December net shipments at 5,613,036 net tons were 7.6 per cent greater than shipments in November.

Accounting for the largest percentages of shipments during December and during the entire year were the following products: Hot-rolled sheets, with, respectively, 11.9 and 11.6 per cent; plates, 10.5 and 10.0 per cent; hot-rolled carbon bars, 9.3 and 9.9 per cent; cold-rolled sheets, 8.7 and 8.6 per cent; and heavy structural shapes, 6.8 and 7.0 per cent. Relative positions of these major products with respect to percentages of total tonnage remained unchanged from the previous month.

Distribution of Steel Products – November, 1947

(In net tons of leading products of all grades, including alloy and stainless)

Market Classification	Shapes	Plates	Hot-Rolled Bars	Cold-Finished Bars	Seamless Tubing	Drawn Wire	Hot-Rolled Sheets	Cold-Rolled Sheets	Coated Sheets	Hot-Rolled Strip	Cold-Rolled Strip	Total (All Products)
Converting and Processing	4,877	45,501	194,147	13,404	13,744	85,794	76,683	4,355	1,251	36,971	6,212	957,053
Jobbers, Dealers, Distributors	70,544	74,719	102,246	25,493	74,398	19,160	68,327	40,303	38,064	9,209	3,426	872,264
Construction, Maintenance	149,741	118,795	32,151	222	9,983	3,638	31,539	2,641	6,728	4,582	1,273	498,291
Contractors' Products	1,215	13,199	13,831	915	1,453	2,529	49,389	28,744	36,633	5,235	6,357	176,755
Automotive, excl. Tractors	3,334	31,145	125,997	19,397	855	18,506	188,909	218,795	8,290	42,308	29,237	723,515
Rail Transportation	50,507	81,767	32,861	546	12	223	25,164	4,086	4,689	2,683	177	398,490
Shipbuilding	5,665	25,757	2,238	176	247	44	728	329	635	24	44	36,453
Aircraft	199	349	287	248	31	.....	222	145	12	4	394	2,173
Oil, Gas Drilling	2,894	8,822	5,969	426	44,092	21	3,085	88	30	24	4	91,157
Mining, Quarrying, Lumbering	1,769	4,117	4,378	394	573	282	1,410	490	188	124	12	21,046
Agricultural	4,151	9,571	43,294	6,646	191	2,814	13,027	3,508	5,182	8,802	317	108,407
Machinery, Industrial Equip., Tools	15,757	51,916	54,747	19,909	7,014	9,270	23,546	8,682	1,339	10,223	4,944	239,190
Elect. Machinery, Equip.	3,562	11,009	7,456	3,656	129	4,733	23,486	10,734	2,347	8,082	4,002	141,267
Appliances, Utensils, Cutlery	.....	537	1,977	3,578	147	3,628	37,194	47,467	8,550	4,350	8,140	140,195
Other Domestic, Commercial Equip.	826	13,705	5,536	3,420	1	24,275	19,218	35,539	5,175	8,289	15,814	143,995
Containers	10	4,068	1,865	27	.....	8,053	59,065	25,003	4,203	13,515	8,057	415,836
Ordnance, Other Military	.....	553	1,271	219	80	27	2	21	4	337	205	7,781
Unclassified	9,584	3,054	41,592	10,209	14,370	42,656	31,431	25,518	2,124	3,152	26,013	370,801
Export	28,790	32,257	31,781	6,464	16,324	6,276	17,795	9,046	4,924	7,445	1,505	359,929
Total	353,425	530,841	703,624	115,349	183,644	231,929	670,220	465,494	130,368	165,359	116,133	5,704,598
*Less shipments to members of industry for conversion	41	17,841	72,387	903	12,980	15,896	49,450	1,951	64	28,201	1,671	487,608
Net Total	353,384	513,000	631,237	114,446	170,664	216,033	620,770	463,543	130,304	137,158	114,462	5,216,990

* All of these shipments were made to the group classified as "Converting and Processing."

Tool Business Unruffled by Market Drop

RECENT break in commodity prices, which caused a flurry of speculation as to what effects it might have in all segments of the economy, appears to have had little immediate repercussion on durable goods buying.

Among machine tool users, caution in buying has been exercised throughout much of the postwar period and probably would have been more pronounced if demand had not been stimulated by the Tool Show.

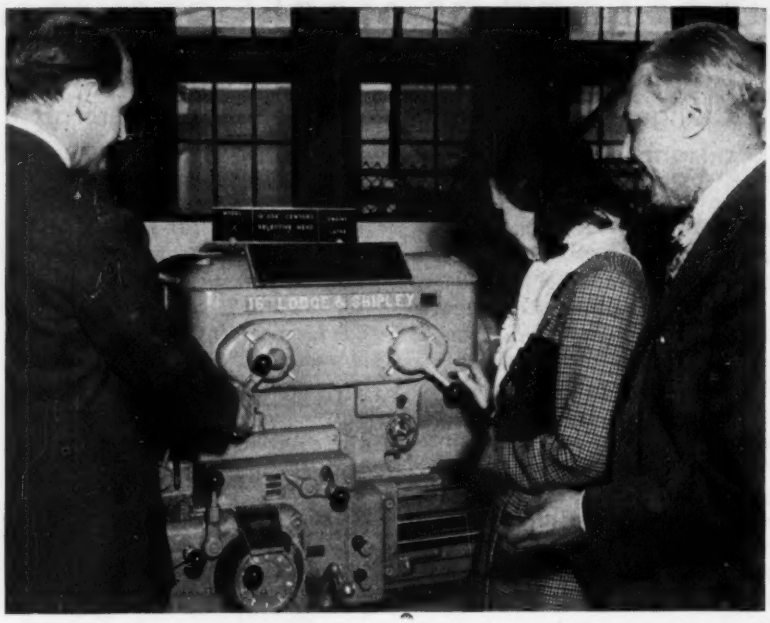
With the exception of only two months since September, 1946, the industry's reported shipments have been in excess of reported new orders.

Long-Range Planning Required — Boards of directors of companies which are prospective buyers of new machine tools have had to project their expectations for marketing their particular products over extended periods, and the longer the delivery time has been on new tools, the longer time these projections have necessarily had to cover. Result has been a careful scrutiny of each machine tool requisition to determine the advisability of its purchase in light of forecast demand for the product to be made on it.

Under these conditions, disturbances in the economic structure such as the price break have no appreciable effect on long-run buying habits unless the momentary ripple suddenly is discovered to be a tidal wave. Whether such is the case at this time is impossible to determine, and until the true significance is learned no builder can say his sales have been affected directly.

That sales are lower this month than last is widely acknowledged, but the reason for the good volume in January and consequently for the poorer showing in February is attributed to the price rises announced late in the earlier month.

Two motivations prompt buying in the face of higher prices: 1. Desire to save money, when the purchase has long been planned; and 2. desire to get a bargain. This latter consideration, although a psychological one, is nevertheless recognized even among hard-headed business men. Builders say that some business came in which they might otherwise never have received simply because of this factor. Price reductions, on the other hand, seem to provide little stimulus to tool buying at least among the more affluent companies.



ROYAL VISITORS: Prince Peter of Greece, his wife, Princess Irene, and William L. Dolle, president of Lodge & Shipley Co., Cincinnati, are pictured, left to right, as the royal visitors inspect an engine lathe at the company's plant

NMTBA Sponsors Course—To elevate the level of machine tool salesmanship above the plane on which it has generally been in the past, a new training course for machinery salesmen will be started this summer under the auspices of the National Machine Tool Builders' Association. This program, which is aimed at opening large new markets, will begin its first course at Cornell University, Ithaca, N. Y., July 12, the seminar to last until July 23. Faculty will consist of professors from the university's Engineering College and of men taken from the industry.

The course will emphasize production cost analysis as a new basis for machine tool selling.

MORE STEEL IN USE

More iron and steel are being used in the United States than at any time in history, the American Iron & Steel Institute reports. Total in use at start of 1947 is estimated at approximately 1,038,000,000 net tons, 14,500 pounds per capita. The greater part of the tonnage is in buildings, bridges, automobiles, farm equipment, rails and railroad equipment, pipelines, ships and machinery.

Since 1900 iron and steel in use has increased over three times as fast as the population, the amount in use per capita in 1947 being about 340 per cent above that of 1900 when the total in use was estimated at 124 million net tons. Per capita use in 1900 was about 3300 pounds.

Since 1871, over 129,900,000 net tons of finished steel products have been exported. Pig iron exports during that period totaled 9,463,894 net tons.

Steel Price Hearing Recessed by FTC

Hearings of the Federal Trade Commission's case against the steel industry's pricing system recessed Feb. 20 and will be resumed Mar. 8 when the larger companies, starting with Carnegie-Illinois Steel Corp., will supply price announcements and other price data for the record.

Only perfunctory hearings will be held during March for the purpose of entering such data on the record. Full-fledged hearings probably will not be resumed before the middle of April, and may be held in New York, Pittsburgh or Chicago.

Last week John L. Neely, procurement analyst, Tennessee Valley Authority, identified various government exhibits intended to show that the steel companies offered identical or matching bids on government steel requirements. Earlier testimony was designed to show identical bids for Navy steel.

AIME Studies New Techniques

Powder metallurgy, use of oxygen in open hearths, heat treatment, gases in steel, theoretical physical metallurgy discussed at 166th meeting

TECHNICAL problems of broad interest to the iron and steel and metalworking industries came in for discussion at the 166th meeting of the American Institute of Mining and Metallurgical Engineers in New York Feb. 15-19. Particular attention was focused on powder metallurgy, use of oxygen in open hearths, heat treatment, gases in steel, mechanical properties and defects and theoretical physical metallurgy, all of which contributed to a well-rounded program.

The convention was attended by more than 3000 members and guests.

New President Inducted—William E. Wrather, director, United States Geological Survey, whose election as president was announced last summer, was inducted into office, succeeding Clyde Williams, director of the Battelle Memorial Institute, Columbus, O.

Gilbert Soler, general superintendent, Atlas Steel Ltd., Welland, Ont., took over the active duties of chairman of the Iron & Steel Division, succeeding Thomas S. Washburn, Inland Steel Co., Chicago; and A. A. Smith Jr., American Smelting & Refining Co., Barber, N. J., succeeded E. A. Anderson, New Jersey Zinc Co., Palmerton, Pa., as chairman of the Institute of Metals Division.

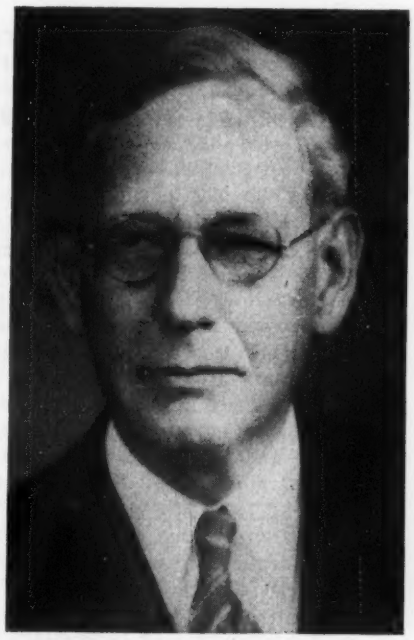
The 25th Howe lecture was presented by Dr. Robert B. Sosman, professor of ceramics, Rutgers University, on "Temperatures in the Open Hearth Furnace," while the 27th Institute of Metals Division annual lecture was delivered by Cyril Stanley Smith, director, Institute for the Study of Metals, University of Chicago, on "Grains, Phases and Interfaces: An Explanation of Micro Structure." Dr. Smith was in charge of the metallurgy phase of the development of the atom bomb project at Los Alamos, N. M.

Eugene G. Grace, chairman, Bethlehem Steel Co., was awarded the Charles F. Rand medal at the annual banquet "for distinguished leadership in the administration of all phases of a large and complex industrial enterprise; for profound influence on the growth and health of the American iron and steel industry."

Others identified with the iron and steel industry who also were honored were B. M. Larsen and T. E. Brower, United States Steel Corp., Kearny, N. J., "for their papers entitled: 'Oxygen in Liquid Open-Hearth Steel—Oxygen Content During the Refining Period' and 'Oxygen in Liquid Open-Hearth Steel—Effect of Special Additions, Stirring Methods and Tapping.'" They received the Robert W. Hunt medal. Benjamin B. Frost, of Arthur G. McKee & Co., Cleveland, was presented with the J. E. Johnson Jr. award "for his paper entitled: 'Performance of Large Hot Blast Stoves.'"

The Alfred Nobel prize (joint award of the Founder Engineering Societies and the Western Society of Engineers) went to John H. Hollomon, General Electric Co., Schenectady, N. Y., "for his paper entitled: 'The Mechanical Equation of State.'"

The Anthony F. Lucas gold medal was awarded to Wallace Everette Pratt, retired, Standard Oil Co., New York, "for his broad vision and leadership in evaluating for industry the application of geology, geophysics and engineering to finding, developing and producing petroleum;" and Rossiter W. Raymond award to E. Charles Patton Jr., Magnolia Petroleum Co., Dallas, Tex., "for his paper entitled: 'The Evaluation of Pressure on Maintenance by Internal Gas Injection and Volumetrically Controlled Reserves.'"



WILLIAM E. WRATHER

Director of the United States Geological Survey, who last week was inducted as president, American Institute of Mining & Metallurgical Engineers

Technical Sessions—Discussions on heat treating, steelmaking, gases in steel and mechanical properties and defects featured sessions of the Iron and Steel Division program. Joint sessions were held with the Institute of Metal Division on theoretical physical metallurgy.

At the technical session on steelmaking, John S. Marsh, research engineer, Bethlehem Steel Co., described the latest developments in "Operation of Oxygen-Enriched Open Hearth Furnaces." The chief process of making oxygen developed in connection with the Fischer-Tropsch process of converting coal into gas and oil is

(*Please turn to Page* 158)

Pig Iron Group Named To Aid on Allocations

An 8-member task committee has been appointed to advise the Office of Industry Co-operation on the program for providing pig iron supplies to sustain production of 10,000 freight cars a month and to advise on other critical pig iron needs.

Members of the pig iron industry advisory task committee are: John H. Bemis, Pickands Mather & Co., Chicago; George Hocker, Bethlehem Steel Co., Bethlehem, Pa.; William Kerber, Hanna Furnace Corp., Detroit; Donald MacArthur, Koppers Co., Granite City, Ill.; Charles S. Northern Jr., Sloss-Sheffield Steel & Iron Co., Birmingham; Claude A. Schmidle, Republic Steel Corp., Cleveland; W. Stewart Scott, Pittsburgh Coke & Chemical Co., Pittsburgh; F. J. Woodburn, American Steel & Wire Co., Cleveland.

It is understood the pig iron industry will be asked to up its allotment of iron for the freight car program from the current 20,000-ton rate to 35,000 tons.

Reports that government allocation of steel to preferred industries would increase allotments to those consuming fields far above the tonnages they have been receiving was denied last week by John Virden, director, Office of Industry Co-operation. He estimated the increase to these industries would total no more than 3,000,000 to 4,000,000 tons, the petroleum industry being the largest beneficiary.

At the same time the recent downtrend in farm commodities may ease steel requirements for the farm equipment program, it was said. Further, it is hoped to increase steel output this year by at least 1,500,000 tons. Little, if any, increase in tonnage for export is anticipated.

Allocation Program Restricted

Steel founders, meeting at Chicago, assured by government spokesman broad allocation of materials is not authorized under the anti-inflation law

GOVERNMENT and industry operations under the anti-inflation act are confined to scarce materials and in no sense is there authority for the government to undertake a broad program of allocation of materials.

This assurance was given delegates to the annual meeting of the Steel Founders' Society of America in Chicago, Feb. 11 and 12, by H. B. McCoy, director, Office of Materials Distribution, Commerce Department, in an address on "The Government—Industry Voluntary Agreement Program."

Predicting that the steel industry again will break all peacetime production records in 1948, Mr. McCoy said steel exports this year would be no greater than they were in 1947, and possibly they might be less.

Scrap Discussed—Discussing "The Problems of the Scrap Market," Edwin C. Barringer, executive vice president, Institute of Scrap Iron & Steel, indicated that in a real sense there is no shortage of scrap, considering the fact the steel industry, has been able to operate week after week at 95 per cent of capacity and higher. However, he agreed there is still not enough scrap to go around.

Regarding pig iron supply Jack Claussen, American Iron & Steel Institute, told the convention that considering primarily the steel foundry industry, heavy demand for gray iron and malleable iron castings following the war resulted in an increase in production of foundry and malleable grades of pig iron and a consequent decline in steelmaking grades.

Production Prospects—Production of pig iron in 1948, he said, will depend on several conditions, including freedom from labor difficulties and adequate supplies of good quality raw materials. Blast furnace capacity is being increased, but early opening of lake transportation and a heavier movement of ore than in 1947 will be necessary.

George B. Christensen, Winston, Strawn & Shaw, Chicago, discussed "Labor's 1948 Position in the Light of the Taft-Hartley Act," tracing the events that effected the balance between labor and management, and outlining the provisions of the Taft-Hartley Act.

H. J. Post, executive vice president, National Association of Personnel Directors, Chicago, outlined some of the gripes of foremen and explained how they result in difficulties for top management. He pointed out that while 95 per cent of all grievances of labor are directed against the company as a whole, 95 per cent of the grievances of foremen are of a personal nature.

The following committee reports were presented: Advertising, by W. F. Wilson, Lebanon Steel Foundry, Lebanon, Pa.; Definitions & Classifications, by A. M. Andorn, Penn Steel Casting Co., Chester, Pa.; Education, by J. A. Sauer, Symington-Gould Corp., Rochester, N. Y.; Personnel, by J. E. Turner, General Steel Castings Corp., Eddystone, Pa.; Research Fund, by G. R. Casey, Treadwell Engineering Co., Easton, Pa.; Sales Manual, by F. H. Bonnet, Buckeye Steel Castings Co., Columbus, O.; Specifications, by W. W. Heimberger, Buckeye Steel Castings Co., Columbus, O.; Technical and Operating, by J. F. Lacey, Commercial Steel Castings Co., Marion, O.; Statistical Reports, by Leslie C. Thellemann; Safety & Technical Research, by Charles W. Briggs.

NEW OFFICERS

Officers of the Steel Founders' Society of America were elected as follows:

President, F. Kermit Donaldson, Machined Steel Casting Co., Alliance, O.

Vice President, B. P. Hammond, Continental Foundry & Machine Co., Pittsburgh.

Treasurer, Keith Williams, Pratt & Letchworth Co. Inc., Buffalo.

Executive vice president and secretary, Leslie C. Thellemann.

Technical and research director, Charles W. Briggs.

Present, Past and Pending

■ FAHYE TRIAL POSTPONED UNTIL MAR. 16

NEW YORK—Trial of A. Terry Fahye, alias Albert Bennett-Fey, whose recent participation in an attempt to purchase Follansbee Steel Corp. resulted in his being charged by New York state with violating a 1939 injunction against him has been adjourned until Mar. 16 because his attorney is out of the country.

■ FOUR SUPER TANKERS TO BE BUILT

NEW YORK—Standard Oil Co. of New Jersey has announced a $21 million program for construction of four super tankers.

■ COLEMAN COMPANY ORDERS 40 STEEL PRESSES

WICHITA, KANS.—Coleman Co. Inc., has ordered 40 steel presses costing about $1 million from Verson Allsteel Press Co., Chicago. Ranging from 45 to 500 tons, the presses will be installed in Coleman's new Wichita plant formerly owned by Culver Aircraft Co.

■ FOLLANSBEE STEEL EXTENDS HOLDINGS

PITTSBURGH—Follansbee Steel Corp. has acquired controlling interest of Federal Enameling & Stamping Co., McKees Rocks, Pa. Federal's management and policies will remain unchanged.

■ JOINS MACHINE TOOL BUILDERS' ASSOCIATION

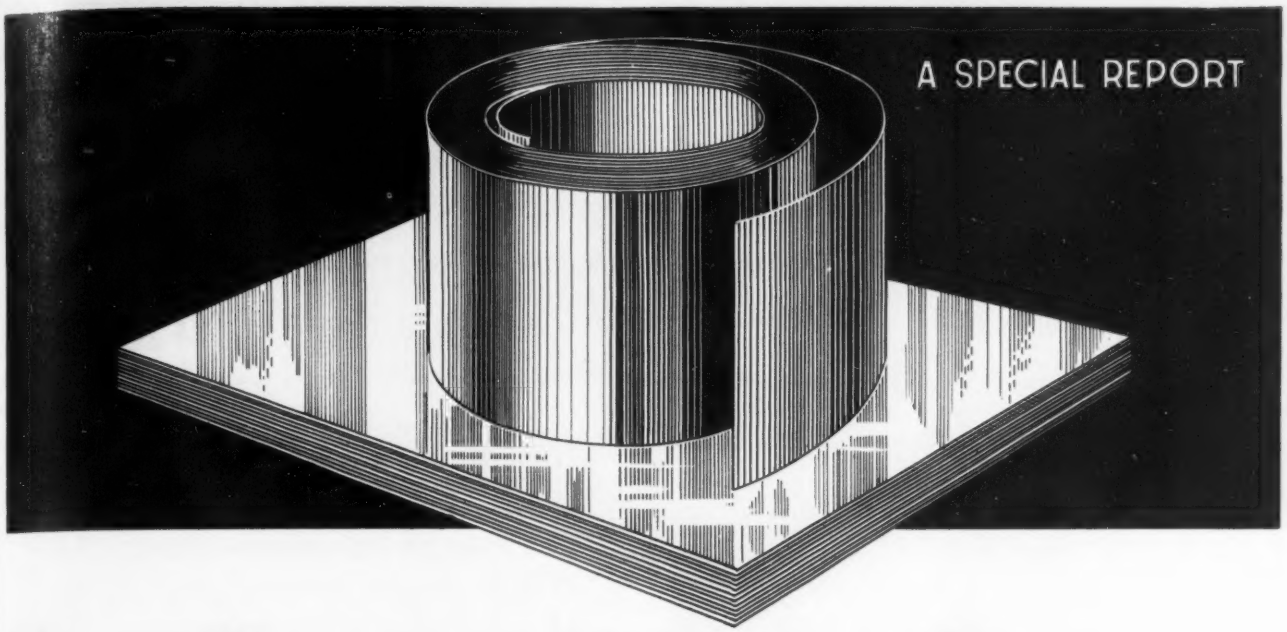
CLEVELAND—Robert H. McGrath has been appointed assistant to Tell Berna, general manager, National Machine Tool Builders' Association. Mr. McGrath, with 25 years' experience in production and sales in the heavy metals manufacturing field, formerly was vice president and general manager of Jos. Dyson & Sons Inc., forgings producer here.

■ ELECTED PRESIDENT OF RESEARCH LABORATORIES

NEW YORK—Dr. A. B. Kinzel, who has been associated with various metallurgical units of Union Carbide & Carbon Corp. since 1926, has been elected president of Union Carbide & Carbon Research Laboratories Inc.

■ CONTINENTAL APPOINTS SHEET SALES MANAGER

KOKOMO, IND.—Continental Steel Corp. has named Howard C. Williams sales manager of its sheet division. He has been sales manager of its merchant trade division since 1940.



The Sheet and Strip Shortage

Metalworking Companies Expect To Use More Flat-Rolled Steel This Year Than in 1947; Added Mill Capacity Promises Some Relief

OF ALL finished steel products, sheets and strip are in greatest demand and tightest supply. To metalworking companies this poses the problem of keeping its plants busy. To the steel industry, with 3.5 million tons of added sheet and strip capacity completed or under construction since the close of the war, it presents the problem of deciding whether to build more plants to supply a market which conceivably could shrink considerably in the next few months.

Only three out of every ten companies were able to buy all the steel sheets and strip they needed last year. The other seven obtained on an average less than two-thirds of their requirements. Some received only a small fraction of their needs.

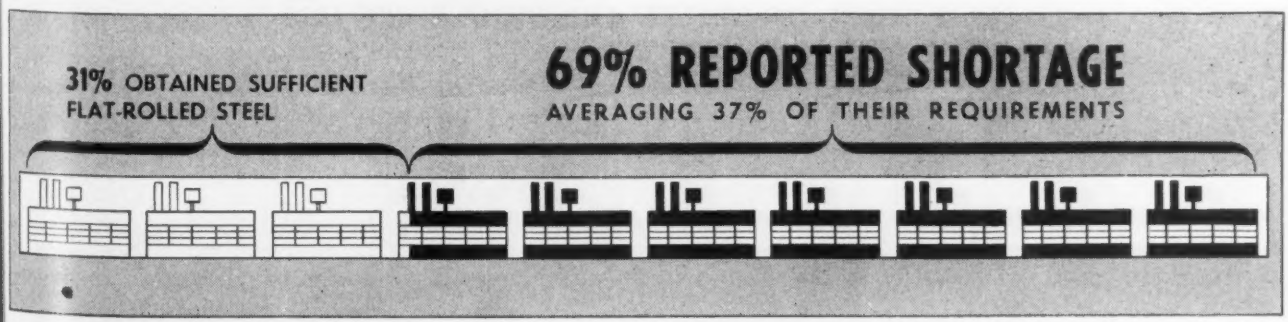
Outlook for 1948 is no better. Three out of five companies say they will need more flat-rolled steel than they did in 1947. Only 9 per cent anticipate requirements will be less than last year.

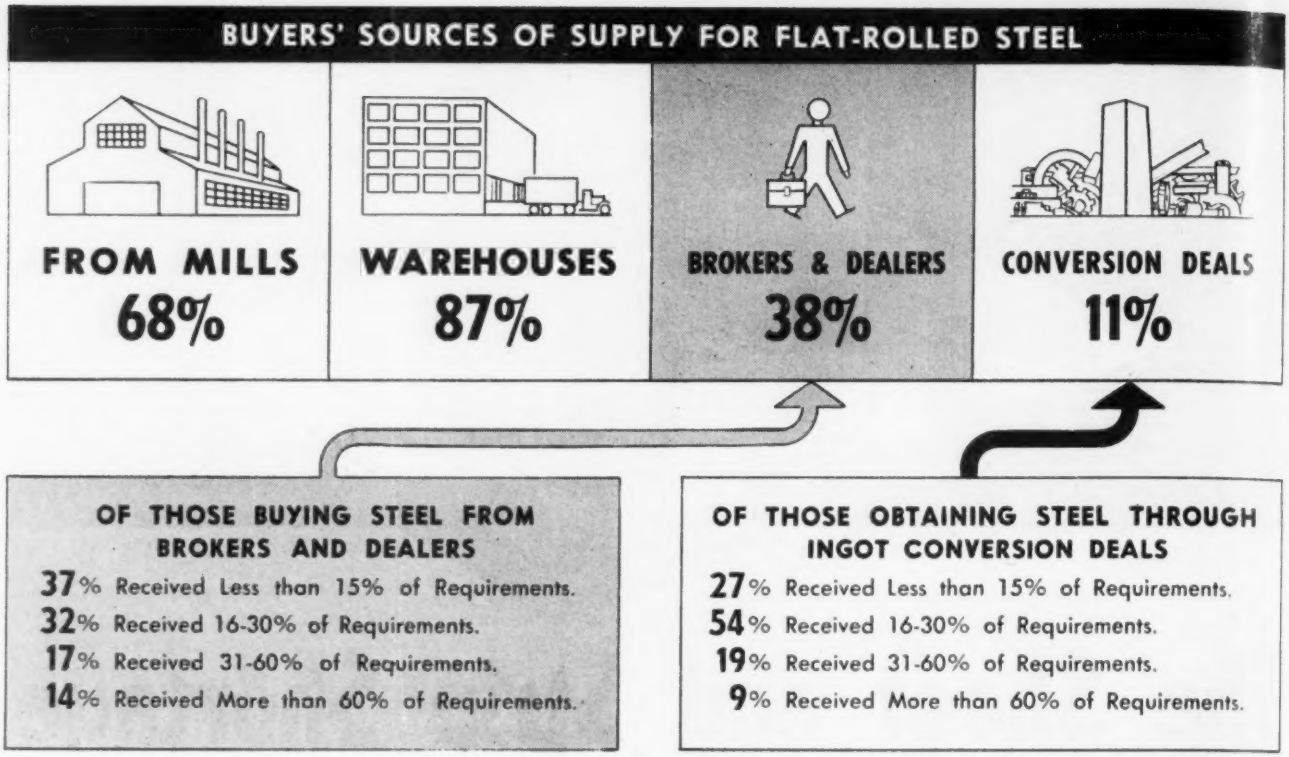
Supply problems of consumers are complicated by: 1) Withdrawal of mills from remote market areas to avoid freight absorption; 2) change of ownership of former suppliers; 3) purchase of sheet mills by large consumers, resulting in at least partial withdrawal of the output of these mills from the open market; 4) wartime expansion of consuming capacity and creation of new companies without historic position on mill books.

Flat-rolled production in 1948 is expected to be moderately higher than last year, as the result of additional steelmaking and rolling capacity. However, the increase in sheets and strip available to domestic consumers, after subtractions for European aid and other favored government programs, will not be as large as the increased demand.

These are some of the conclusions of a comprehensive survey of the supply-demand situation in sheets and strip conducted by the editors of STEEL. The survey included a questionnaire study of representative consuming companies, a check of additions to rolling capacity, and interviews with both consumers and producers.

MANY ARE SHORT—Only 31 per cent of consuming companies report they were able to obtain all the




BUYERS' SOURCES OF SUPPLY FOR FLAT-ROLLED STEEL
FROM MILLS
68%
WAREHOUSES
87%
BROKERS & DEALERS
38%
CONVERSION DEALS
11%
OF THOSE BUYING STEEL FROM BROKERS AND DEALERS
37% Received Less than 15% of Requirements.
32% Received 16-30% of Requirements.
17% Received 31-60% of Requirements.
14% Received More than 60% of Requirements.
OF THOSE OBTAINING STEEL THROUGH INGOT CONVERSION DEALS
27% Received Less than 15% of Requirements.
54% Received 16-30% of Requirements.
19% Received 31-60% of Requirements.
9% Received More than 60% of Requirements.

sheets and strip they needed for 1947 operations.

Sixty-nine per cent of flat-rolled users fell short of obtaining their requirements, and on an average received only 63 per cent of what they needed.

This shortage existed in the face of a record production year for flat-rolled steel. More than 18 million tons of sheet and strip, excluding tin mill products, were produced in 1947, easily eclipsing the former record of 15.7 million tons produced in 1941 and 14.1 million tons in 1946.

The shortage was most acute in galvanized sheets and strip. Users say they were able to obtain only 55 per cent of their requirements for these products.

Buyers of hot-rolled sheets received 66 per cent of what they wanted in 1947; cold-rolled sheet users received 69 per cent of stated requirements; hot-rolled strip buyers received 74 per cent of needs; and cold-rolled strip buyers 80 per cent.

SEE LARGER NEEDS IN 1948—Sixty per cent of sheet and strip users report their needs this year will be greater than in 1947. Only 9 per cent expect requirements to be lower and the remaining 31 per cent expect their needs to be unchanged.

These estimates are challenged by market research analysts of producing companies who believe the 1948 demand indicated by the consumers is inflated. In some cases plants say they need more steel than they can possibly use. They also point out the likelihood that consumers have reported 1948 demand at the maximum tonnage that could be used under optimum conditions, and believe that the 1948 demand indicated could be discounted substantially.

One hundred fifteen typical small and medium sized consumers, excluding such major users as the automotive companies, reported the following receipts for 1947, needs for 1947 and what they expect to need in 1948:

	Tonnage Received In 1947	Tonnage Needed In 1947	Tonnage Needed In 1948
Hot-rolled sheets	37,614	56,811	63,332
Cold-rolled sheets	53,024	77,163	89,907
Hot-rolled strip	10,312	13,202	16,092
Cold-rolled strip	8,196	10,243	11,990
Galvanized sheets	7,746	13,821	17,067
Electrical sheets	10,524	15,996	17,199

SHIPMENTS OF SHEETS AND STRIP SINCE 1937

(Showing Thousands of Net Tons and Percentages of Total Finished Steel)

YEAR	SHEETS Hot-Rolled		SHEETS Cold-Rolled		SHEETS Galvanized		STRIP Hot-Rolled		STRIP Cold-Rolled		TOTAL Sheet & Strip		TOTAL Finished Steel	
1947	7,820	12.4%	5,408	8.6%	1,615	2.6%	1,736	2.7%	1,613	2.6%	18,192	28.9%	62,755	100%
1946	5,956	12.2%	4,075	8.4%	1,462	3.0%	1,363	2.8%	1,282	2.6%	14,140	29.0%	48,775	100%
1945	6,327	11.2%	2,891	5.1%	1,693	3.0%	1,369	2.4%	1,275	2.3%	13,557	24.0%	56,602	100%
1944	6,112	9.7%	2,031	3.2%	1,378	2.2%	1,438	2.3%	1,191	1.9%	12,151	19.3%	63,250	100%
1943	6,155	9.9%	1,549	2.5%	823	1.3%	1,360	2.2%	1,155	1.9%	11,045	17.8%	62,210	100%
1942	6,012	9.9%	1,518	2.5%	972	1.6%	1,280	2.1%	952	1.6%	10,736	17.7%	60,591	100%
1941	8,006	13.1%	3,024	5.0%	1,621	2.7%	1,768	2.9%	1,322	2.2%	15,743	25.9%	60,942	100%
1940	6,197	13.5%	2,436	5.3%	1,551	3.4%	1,349	2.9%	790	1.7%	12,325	26.8%	45,965	100%
1939	5,087	14.6%	2,021	6.1%	1,394	4.0%	1,160	3.3%	676	1.9%	10,341	29.9%	34,955	100%
1938	2,603	12.2%	1,343	6.3%	996	4.7%	927	4.4%	428	2.0%	6,299	29.6%	21,356	100%
1937	4,731	12.3%	2,274	5.9%	1,330	3.5%	2,013	5.3%	816	2.1%	11,167	29.1%	38,345	100%

SEARCH FOR STEEL FRANTIC—Faced with the heavy unbalance in the supply and demand for sheets and strip, users resorted to whatever expedients were possible to obtain material to keep their plants in operation. Some surplus material was available but this generally was either small in quantity or was unsuited to many uses.

Mills were unable to meet all demands of their old customers, let alone the new ones who came to their doors clamoring for steel after the war.

Warehouses received almost 11 per cent of total output of sheets and strip, but their demand was many times this amount.

Opportunists in the form of dealers and brokers, many brand new to the steel business, found customers for whatever steel they could obtain, and at exorbitant prices.

Ingot conversion deals supplied flat-rolled material to some users. This arrangement, one of the most interesting in the postwar steel shortage, utilizes the plusses and minusses of overall capacity. Steel thus obtained costs considerably more than the mill price but generally is substantially below the gray market quotations.

A number of variations of this practice are being followed. The customer may supply scrap, either his own or purchased, to an electric furnace operator and pay a conversion charge for having it converted into ingots. Or the customer may purchase ingots outright from a mill having an excess of steelmaking over finishing capacity. Cost of ingots varies from $75 up to around $100.

The buyer then ships the ingots to a mill with open rolling capacity for conversion. He may pay a straight conversion charge for having it reduced to sheets. Or he may sell the ingot to the mill at a figure below what it cost him and be permitted to buy sheets from the mill at the market price. Conversion charges may range from $20 to $25 for hot-rolled and from $40 to $50 for cold-rolled, with the scrap remaining with the mill. If the ingot is sold to the mill, the price may range from $30 to $35.

Under such arrangements, scrap originating in Detroit may, for example, be shipped to the Mahoning Valley for conversion to ingots, the ingots shipped to Chicago for reduction to sheets, and the finished material shipped back to Detroit. Freight charges naturally figure prominently in the final costs of the sheets, which may be double, or more, the mill base price.

The majority of consumers report they patronized more than one source for sheets and strip. Only 18 per cent, for example, purchased all their flat-rolled material from the mills. Twenty-four per cent dealt with warehouses exclusively. Very few obtained all their requirements from either brokers or through conversion deals.

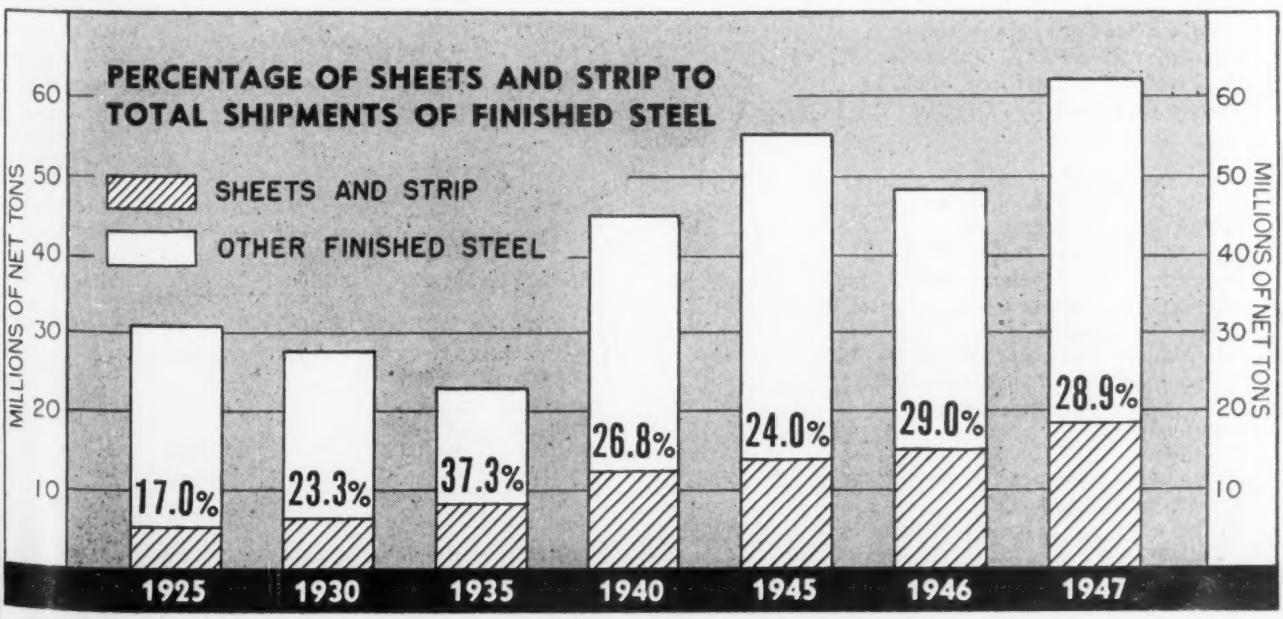
Sixty-eight per cent purchased part of their material from mills; 87 per cent received flat-rolled from warehouses; 38 per cent bought a portion of their requirements from dealers and brokers; and 11 per cent supplemented their supplies through conversion arrangements.

PRICES—Buyers report a wide range of prices paid for sheets and strip. Highest reported paid was $320 a ton plus freight from shipping point. Offers at up to $340 a ton, plus shipping costs, are cited. Many purchases in the gray market in the range of $200 to $270 a ton for hot-and cold-rolled sheets are noted.

Buyers report that gray market prices recently are higher than they were three months ago. Some companies report they "have been cut off even by the gray market operators."

A common complaint by sheet and strip users is that they have had to pay extras to mills and warehouse for unnecessary qualities.

SUBSTITUTIONS—Acceptance of flat-rolled materials which do not fit the user's exact specifications



PRODUCERS OF SHEETS AND

This compilation of current maximum annual potential capacities is based upon the American Iron & Steel Institute's Directory of Steelworks for 1945 and information obtained from individual companies. It should be noted that capacity figures comprise the total tonnage of each product that could be produced under full operations, assuming exclusive use of all available facilities and without regard to the availability of ingots. For mills which produce more than one product, full capacity for each product is shown, regardless of the fact that these facilities do not have the capacity to produce the aggregate tonnage shown for all such products.

		Hot-Rolled Sheets	Cold-Rolled Sheets	Galvanized Sheets, Strip	Hot-Rolled Strip	Cold-Rolled Strip	Long Terne
Acme Steel Co., Chicago				95,000	545,000	200,000	
Alan Wood Steel Co., Conshohocken, Pa.		77,500					
Allegheny Ludlum Steel Corp.	TOTAL	135,000	15,000		165,000	97,500	
Brackenridge, Pa.		135,000	15,000				
West Leechburg, Pa.					165,000	97,500	
Alloy Metal Wire Co., Prospect Park, Pa.						500	
American Chain & Cable Co., Bridgeport, Conn.						5,000	
American Rolling Mill Co.	TOTAL	2,164,000	1,130,000	324,000			70,00
Ashland, Ky.		600,000		103,000			
Butler, Pa.		504,000	270,000	62,000			
Middletown, O.		936,000	860,000	159,000			70,00
Zanesville, O.		50,000					
Sheffield Steel Corp., Kansas City, Mo.		37,500					
Sheffield Steel of Texas		37,500					
American Shim Steel Co., New Kensington, Pa.						18,000	
Atlantic Steel Co., Atlanta, Ga.					97,000		
Bethlehem Steel Co.	TOTAL	1,625,000	500,000	288,000			
Sparrows Point, Md.		675,000	50,000	240,000			
Lackawanna, N. Y.		950,000	450,000	48,000			
Blair Strip Steel Co., New Castle, Pa.						18,000	
Borg-Warner Corp.	TOTAL	268,000		60,000	3,000		20,0
Chicago		120,000					
New Castle, Ind.		25,000					
Franklin, Pa.		3,000					
Chicago Heights, Ill.					3,000		
Canton, O.		120,000		60,000			20,0
California Cold Rolled Steel Corp., Los Angeles						31,200	
Carpenter Steel Co., Reading, Pa.						8,400	
Cleveland Cold Rolling Mills Co., Cleveland						240	
Cold Metal Products Co., Youngstown						60,000	
Colonial Steel Co., Monaca, Pa.,		1,120					
Colorado Fuel & Iron Corp., Pueblo, Colo.					12,000		
Connors Steel Co., Birmingham, Ala.					45,000		
Continental Steel Corp., Kokomo, Ind.		95,000		73,000			
Crucible Steel Co. of America	TOTAL	21,000	9,600			12,300	
Pittsburgh		21,000	9,600				
Jersey City, N. J.						12,300	
Detroit Steel Corp., Detroit						150,000	
Disston & Sons Inc., Henry, Philadelphia		7,500				20,000	
Eastern Stainless Steel Corp., Baltimore		[1]15,000	[1]9,000				
Elliott Brothers Steel Co., New Castle, Pa.						20,000	
Empire Steel Corp., Mansfield, O.[2]		120,000					14,4
Follansbee Steel Corp., Follansbee, W. Va.		35,000				254,800	12,0
Ford Motor Co., Dearborn, Mich.		465,000	182,000		186,000		
Granite City Steel Co., Granite City, Ill.		326,000	400,000	60,000			
Greer Steel Co.	TOTAL					72,000	
Dover, O.						40,800	
Anderson, Ind.						30,000	
Detroit						1,200	
Griffin Mfg. Co., Erie, Pa.						36,000	
Hind Steel Co. Inc., Union, N. J.						3,000	
Inland Steel Co., Indiana Harbor, Ind.		1,850,000	500,000	86,400	187,000	24,000	
International Detrola Corp., Newport Rolling Mill Division, Newport, Ky.		180,000		96,000			16,0
International Harvester Co., South Chicago, Ill.					35,000		
Jessop Steel Co., Washington, Pa.		6,900	2,000			1,000	
Jones & Laughlin Steel Corp.	TOTAL	1,368,000	540,000		180,000	168,000	
Pittsburgh		720,000	360,000				
Cleveland		648,000	180,000		180,000	168,000	
Joslyn Mfg. & Supply Co., Fort Wayne, Ind.					10,000		
Kaiser Co., Fontana, Calif.						24,000	
Kaiser & Frazer Indianapolis Steel Rolling Mill Division, Indianapolis		84,000					
Knoxville Iron Co., Knoxville, Tenn.					6,000		

STRIP IN THE UNITED STATES

		Hot-Rolled Sheets	Cold-Rolled Sheets	Galvanized Sheets, Strip	Hot-Rolled Strip	Cold-Rolled Strip	Long Ternes
Laclede Steel Co., Alton, Ill.					184,000		
Mahoning Valley Steel Co., Niles, O.[2]		97,500					
McLouth Steel Corp., Detroit					108,000	75,000	
National Standard Co., Clifton, N. J.						6,000	
National Steel Corp.	TOTAL	3,080,000	2,250,000	150,000	468,000	105,000	30,000
Great Lakes Steel Corp., Ecorse, Mich.		2,000,000	1,200,000		[4]120,000	[4]120,000	
Weirton Steel Co., Weirton, W. Va.		1,080,000	1,050,000	150,000	468,000	105,000	30,000
Newman-Crosby Steel Corp., Pawtucket, R. I.						20,000	
Parkersburg Steel Co., Parkersburg, W. Va.		36,000					
Phoenix-Apollo Steel Co., Apollo, Pa.		132,000		24,000			
Reeves Steel Co., Dover, O.		87,240		42,120			
Republic Steel Corp.	TOTAL	1,878,000	920,000	330,000	1,100,000	205,000	25,000
Warren, O.		630,000	295,000		470,000	180,000	
Canton, O.		98,000		200,000			25,000
Cleveland		1,000,000	625,000	20,000			
Gadsden, Ala.		150,000		110,000			
Massillon, O.						25,000	
Youngstown, O.					630,000		
Rhode Island Steel Corp., Pawtucket, R. I.						3,000	
Roebling's Sons Co., John A., Trenton, N. J.				10,000		24,000	
Rome Strip Steel Co., Rome, N. Y.						14,400	
Sharon Steel Corp.	TOTAL	125,000		121,200	600,000	205,000	
Sharon, Pa.				60,000	600,000	100,000	
Brainard Steel Corp., Warren, O.				9,600		35,000	
Strip Div. of Detroit Tube & Steel Co., Dearborn, Mich.						70,000	
Niles Rolling Mill Co., Niles, O.		125,000		51,600			
Simmons Co., Kenosha, Wis.					2,700		
Simonds Saw & Steel Co., Lockport, N. Y.		4,000			780	220	
Stanley Works	TOTAL				150,000	144,000	
Bridgeport, Conn.					150,000	50,000	
New Britain, Conn.						94,000	
Superior Steel Corp., Carnegie, Pa.					115,000	85,000	
Thomas Steel Co., Warren, O.						67,000	
Thompson Wire Co.	TOTAL					42,000	
Mattapan, Mass.						20,000	
Worcester, Mass.						2,000	
Chicago						20,000	
United States Steel Corp.	TOTAL	4,330,960	750,860	777,810	2,948,060	264,500	93,000
American Steel & Wire Co.	*Total*		18,000	30,400	91,000	264,500	
Cleveland			18,000	12,000	83,200	221,900	
Duluth					7,800		
New Haven, Conn.						10,400	
Worcester, Mass.				18,400		32,200	
Carnegie-Illinois Steel Corp.	*Total*	3,758,430	732,860	459,500	2,618,460		93,000
Columbia Steel Co.	*Total*	174,530		100,910	80,000		
Tennessee Coal, Iron & R. R. Co.	*Total*	398,000		187,000	158,600		
Universal-Cyclops Steel Corp., Bridgeville, Pa.		13,100			9,600	69,250	
Wallace Barnes Co., Bristol, Conn.						10,000	
Wallingford Steel Co., Wallingford, Conn.						50,000	
Washburn Wire Co., Phillipsdale, R. I.					61,200		
Washburn Wire Co., New York						23,100	
Washington Steel Corp., Washington, Pa.						[1]18,000	
Wheeling Steel Corp.	TOTAL	801,000	480,000	390,000			24,000
Steubenville, O.		693,000	480,000	270,000			
Beech Bottom, W. Va.		108,000					24,000
Martins Ferry, O.				120,000			
Worcester Pressed Steel Co., Worcester, Mass.						7,500	
Youngstown Sheet & Tube Co.	TOTAL	528,000	466,000		31,000	30,000	
Campbell, O.		288,000	456,000		30,000	30,000	
Indiana Harbor, Ind.		240,000	10,000				
East Chicago, Ind.					1,000		
GRAND TOTAL		19,956,820	8,154,460	2,927,530	7,249,340	2,691,910	304,400

In addition to capacity listed above, new mills scheduled for completion or modernization will increase potential capacity.

Portsmouth Steel Corp. plans to install hot mills with capacity of 1,000 tons.

Valley Mfg. Co., Hudson Motor Car Co. subsidiary, will install hand mills in Shenango Tin Plate mill at New Castle, Pa., with capacity 100,000 tons of hot-rolled sheets.

Continental Steel Corp. is installing sheet hot rolling facilities to 4 nearly 40,000 tons by the end of 1948 and galvanizing facilities add 18,000 tons capacity at Kokomo, Ind.

Acme Steel Co. will add 120,000 tons of cold rolling capacity at River-e, Ill.

Sharon Steel Corp. will complete facilities in 1948 to add 250,000 s of hot-rolled strip and 36,000 of cold-rolled strip.

Inland Steel Co. is revamping a 42-in. mill at Indiana Harbor to add an estimated 200,000 tons cold rolling capacity.

United States Steel Corp. figures listed above do not reflect the increase in sheet capacities at Irvin Works, Gary Works, Fairfield Works and Pittsburg, Calif., expected in production prior to the end of 1948, nor the Torrance plant located near Los Angeles, expected to be in production before the end of 1949. A total increase of 845,000 tons of sheets is expected from these facilities.

Bethlehem Steel Co. has completed a new 66-inch continuous hot strip mill at Sparrows Point, Md., which may add more than a million tons. Cold rolling capacity also has been increased. Bethlehem's additions are not reflected in figures above.

[1] Stainless steel.
[2] Owned by Studebaker Corp.
[3] Owned by General Electric Co.
[4] Slitting capacity only; not included in total.

is common. This has led to many substitutions, some of which make little sense. For example, one company reports using galvanized sheets in place of hot-rolled. A number are substituting cold-rolled where hot-rolled would normally be used. Others use hot-rolled sheets in applications where cold-rolled would be preferable. In some cases, users substitute high-cost stainless sheets for the more scarce carbon material.

Most common substitution, however, is aluminum sheets for steel. About 11 per cent of the companies report they now are using aluminum sheets in some applications where steel formerly was used. Some of these indicate, that having changed over their equipment to handle aluminum, they will continue its use even after steel becomes more readily available.

NEW CAPACITY—Important additions have been made to sheet and strip capacity since the end of the war and further facilities are being installed. The increased capacity is provided by both new mills and by the revamping and speeding up of older mills.

The table on pages 58 and 59 lists the latest available figures for maximum annual potential capacity for all companies in the United States. It is important to note that maximum annual potential capacity is the total tonnage of each product that could be produced under full operations, assuming exclusive use of all available facilities and without regard to the availability of ingots or semifinished steel. For those types of rolling mills which can be used for more than one product, the full capacity for each product is shown, regardless of the fact that such facilities do not have capacity to produce the aggregate tonnage shown for all such products.

For example, the maximum annual potential capacity for hot-rolled sheets includes the capacity utilized for the production of breakdown coils to be used in producing cold-rolled sheets, cold-rolled strip, galvanized sheets and some tin mill products. In addition the capacity for hot-rolled sheets reflects facilities which also are included in the capacity as stated for hot-rolled strip, and this same condition prevails between cold-rolled sheets and cold-rolled strip. Continuous strip mills may be used also for rolling light plates and skelp.

Obviously, extreme care must be exercised in interpreting these figures lest an erroneous impression be obtained as to total flat-rolled capacity.

Probably the best measure of actual sheet and strip capacity at present is 1947 production. Due to the extremely heavy demand, sheet and strip mills were worked close to practical capacity.

Total additions to sheet and strip capacity, completed since the war and now being built, are estimated at around 3.5 million tons.

This reflects a long-range trend toward a greater proportion of total steel output being sold as flat-rolled products, which has been evident over the past two decades or more and which is expected to continue. Some producers predict that the proportion of flat-rolled steel, including tin mill products, to the total of all finished products eventually will reach 50 per cent. Currently, about 30 per cent of total finished steel products are sheets and strip, exclusive

SHEET AND STRIP SHIPMENTS BY MARKET CLASSIFICATIONS

CLASSIFICATION	Percent 1947
Automotive, Excluding Tractors	31.92%
Jobbers, Dealers, Distributors	10.76%
Contractors' Products	9.05%
Containers	7.54%
Appliances, Utensils, Cutlery	7.20%
Other Domestic, Commercial Equip.	5.56%
Electrical Machinery, Equipment	5.34%
Machinery, Indus. Equip., Tools	3.47%
Construction, incl. Maintenance	3.07%
Converting, Processing	2.94%
Exports	2.82%
Rail Transportation	2.32%
Agricultural	2.21%
All Other	5.80%

ANALYSIS OF SHEET AND STRIP SHIPMENTS—1947

Classification	Hot Rolled Sheets	Cold Rolled Sheets	Coated Sheets	Electrical Sheets Strip	Enameling Sheets	Hot Rolled Strip	Cold Rolled Strip	Total Flat Rolled	Per Cent of Shipments
Converting, Processing	281,595	27,080	14,011	257	.....	150,023	62,231	535,197	2.94
Jobbers, Dealers, Distributors	880,478	455,545	438,633	3,845	1,295	129,997	48,565	1,958,358	10.76
Construction, Incl. Maintenance	345,351	38,334	87,835	30	200	64,663	22,603	559,016	3.07
Contractors' Products	593,672	391,965	467,345	179	26,756	97,524	69,601	1,647,042	9.05
Automotive, excl. Tractors	2,131,009	2,740,143	96,823	4,286	11,119	502,798	321,690	5,807,868	31.92
Rail Transportation	292,029	35,618	54,579	3,140	44	33,039	3,772	422,221	2.32
Shipbuilding	12,816	4,045	5,518	32	.....	1,304	440	24,155	0.13
Aircraft	1,925	2,429	691	156	.....	1,204	1,753	8,158	0.04
Oil, Gas Drilling	29,288	2,268	904	63	.....	1,550	553	34,626	0.19
Mining, Quarrying, Lumbering	18,517	2,926	2,096	4	.....	2,687	89	26,319	0.14
Agricultural	169,086	35,504	91,499	17	331	100,890	4,119	401,446	2.21
Machinery, Ind. Equip., Tools	311,583	100,587	18,465	4,930	280	129,630	66,512	631,987	3.47
Elect. Mach., Equip.	275,169	120,380	31,661	427,875	2,576	72,385	41,511	971,557	5.34
Appliances, Utensils, Cutlery	360,051	565,512	98,720	3,460	153,103	44,406	84,374	1,309,626	7.20
Other Domestic, Com. Equip.	244,086	411,424	57,681	2,872	28,610	92,721	174,157	1,011,551	5.56
Containers	707,454	317,642	48,231	.....	41	185,857	112,967	1,372,192	7.54
Ordnance, Other Military	1,974	810	74	1	.....	82	1,769	4,710	0.03
Unclassified	354,618	49,109	33,896	.....	.....	50,960	468,966	957,549	5.27
Export	215,075	118,951	71,427	15,900	2,043	71,680	19,186	514,262	2.82

November-December Shipments Estimated.

Consumers' Comments on the Sheet-Strip Shortage

..."While we have had comparatively little trouble in obtaining steel, all at base prices, we have had to pay extras for unnecessary quality to obtain delivery."

..."We manufacture bakers' ovens and have substituted galvanized for black, cold-rolled sheets for enameling sheets and use heavier gages."

..."Because of large purchases of stainless, we do not have great difficulties in obtaining carbon steel sheet and strip."

..."We have had to purchase from brokers almost exclusively and have had to pay up to $250 per ton f.o.b. shipping point."

..."We have had no trouble in getting all the steel we need from mills."

..."We have paid brokers 10 to 15 cents a pound for hot-rolled sheets."

..."We have paid from mill price up to $300 a ton in the gray market. We bought 300 tons of hot-rolled sheets in one purchase in Detroit and paid $245 per ton f.o.b. Detroit for shipment to Los Angeles, substituting hot-rolled for galvanized. We can no longer pay the high prices for gray market steel and have had to cut production."

..."Brokers' prices are 25 per cent higher than three months ago, though we no longer purchase from them. Have substituted aluminum in several applications, which may stick."

..."Hot-rolled and cold-rolled sheets almost impossible to obtain. Have paid as high as 13½ cents, f.o.b. shipping point. We are using aluminum as a substitute."

..."We have often opened our tolerances and specifications. We have paid up to 8 cents a pound above base price to avoid shutdown. We have substituted aluminum. We frequently are completely frustrated."

..."We are ignored."

..."We have been unable to place an order with any mill for 1948. Our regular supplier has withdrawn from the territory and we cannot find another mill which will take our order. At present, we are using aluminum sheets."

..."Our plant is closed, due to lack of galvanized sheets and hot-rolled sheet and strip, for the first time since we started in 1886."

..."Steel mills aren't fair in distribution."

..."The one mill that supplied all our 20 and 22 gage material withdrew from this district. Other mills won't accept our accounts or don't roll the lighter gages. I am spending 80 per cent of my time trying to get steel. Pass the aspirin!"

..."Have had to substitute hot-rolled (then have it pickled) for cold-rolled. Substituted aluminum. Purchased coil ends and had them flattened. Used auto body rejects. Prices ranged from $90 to $270 a ton."

..."We have a better stock now than at any time since the end of the war. Maybe we're wrong, but we feel quite optimistic over the steel situation these days."

..."Had to deal with brokers all through 1947 to supplement our requirements. Paid up to $15 cwt on sheets."

..."Eastern mills discontinued shipping (to Milwaukee) due to freight absorption. Unable to place tonnage lost in Chicago district."

..."We have had to substitute zinc-coated bonderized sheets for hot-rolled."

..."Have paid as high as 14 cents for hot-rolled sheets. Substituting aluminum for galvanized sheets and stainless for heavier gages of hot-rolled."

..."Purchased 70 per cent of steel through brokers at prices ranging from $200 to $270 a ton."

of tin mill products; in 1925 only 17 per cent of the total was sheets and strip.

The proportion of sheets and strip to totaled finished steel is higher in years of poor or only fair business than in peak production years. Automobiles and refrigerators are sold more readily in years of below average business than are the capital goods requiring the heavier steel products.

A sharp trend is noted toward greater use of cold-rolled sheets in relation to hot-rolled material. Projections of consumers' estimates of 1948 demand indicate that requirements for cold-rolled sheets this year are triple those in 1941, while demand for hot-rolled sheets has increased only 50 per cent from 1941 to 1948. Demand for cold-rolled strip is increasing faster than that for hot-rolled strip. On the production side, this trend is reflected in the many installations of new cold rolling capacity.

DISTRIBUTION OF SHEETS, STRIP—The automotive industry last year took 31.92 per cent of total sheet and strip production, a substantial increase over their 1946 share of 27.83 per cent. Traditionally, the auto industry has been by far the largest single market for flat-rolled steel.

Contractors' products, containers, appliances and similar domestic equipment, electrical equipment and machinery, other industrial machinery and equipment, and construction are among the important consuming outlets.

Warehouses last year distributed 10.76 per cent of

the total sheet and strip output, somewhat below the 13.17 per cent distributed in 1946.

Exports of sheets and strip in 1947 amounted to 2.82 per cent of the total, compared with 3.26 per cent in 1946.

PRODUCTION PROSPECTS—Sheet and strip production will be increased moderately in 1948. Despite increased capacity, steelmakers doubt that ingot output can be increased much more than a million tons, due largely to the shortage of pig iron, scrap and other raw materials. Granting that most of this increase can be directed into flat-rolled production, it does not appear likely that output of sheets and strip will be much above 19 million tons. Part of this will be produced on the captive rolling mills owned by consumers and will not be available of the open market. The European Recovery Program, the freight car program and other government favorites will subtract from the total tonnage available for sale to metalworking companies.

Major producers predict that not more than 18.5 million tons will be available to consumers in the United States in 1948.

Any discussion of the shortage of finished steel products is likely to prompt demands that the productive capacity of the industry be enlarged, particularly by government and labor officials and by people outside the industry.

The steel industry, of course, has made large expansions and improvements since the war. Expenditures for this purpose to the end of 1948 will total $1.4 billion, and further large expenditures are projected for 1949. Ingot capacity has been increased 3 million tons since the end of the war and nearly 2 million tons more will be added by the end of 1949. Comparable additions are being made in pig iron, coking and finishing capacity.

To add large amounts of integrated capacity poses serious problems of financing, raw materials supply and the use of steel products for construction of new capacity during the period of most critical shortage.

New integrated steelmaking capacity at today's prices would cost about $250 per ton of annual capacity. Existing capacity is capitalized at about $50 per ton. The increase in steel prices that would be necessary to carry the capital cost of new facilities would be heavy and is estimated by some producers at $20 a ton.

Development of new ore sources and coal mines to supply new steelmaking capacity over a long period would pose further difficult problems.

SHEET MILLS RECENTLY PURCHASED BY CONSUMERS

PURCHASER	PLANT	CAPACITY
General Electric Co. Schenectady, N. Y.	Mahoning Valley Steel Co. Niles, O.	97,500 tons hot-rolled sheets
International Detrola Corp. Detroit	Newport Rolling Mill Co. Newport, Ky.	180,000 tons hot-rolled sheets 96,000 tons galvanized sheets 16,000 tons long ternes
Borg-Warner Corp. Chicago	Superior Sheet Steel Co. Canton, O.	120,000 tons hot-rolled sheets 60,000 tons galvanized sheets 20,000 tons long ternes
	Franklin Steel Works Franklin, Pa.	3,000 tons hot-rolled sheets
Phoenix-Apollo Steel Co.	Apollo Steel Co. Apollo, Pa.	132,000 tons hot-rolled sheets 24,000 tons galvanized sheets
Studebaker Corp. South Bend, Ind.	Empire Steel Corp. Mansfield, O.	120,000 tons hot-rolled sheets 14,400 tons long ternes
Valley Mfg. Co. Subsidiary of Hudson Motor Car Co., Detroit	Shenango Tin Plate Plant New Castle, Pa. (leased)	100,000 tons hot-rolled sheets
Kaiser-Frazer Co. Detroit	Chapman Price Steel Co., Indianapolis	84,000 tons hot-rolled sheets

Aluminum Use Growing on West Coast

SAN FRANCISCO

ALUMINUM is finding increasing applications on the West Coast.

Use of the light metal in truck trailers is expanding. At present, truck trailers of aluminum are being produced by two West Coast companies, one in Spokane, Wash., the other in the San Francisco area. A third company, at Berkeley, Calif., soon will begin production of aluminum trailers and a fourth motor truck maker is experimenting with aluminum in making truck power units.

One reason for this expansion is the saving in weight which aluminum provides. Most states have truck transportation laws which put restrictions on the weight of trucks and trailers. The result is this: Cargo payloads must be reduced pound for pound with each increase in truck and trailer weights. And, conversely, for each pound that equipment weight can be reduced, the payload can be increased.

One immediate factor which may delay widespread adoption of aluminum in truck trailer bodies is a shortage of the light metal. Demand is outrunning production, and shortage of power in some parts of the country is restricting aluminum output. That is particularly true in the Pacific Northwest where an electricity shortage is delaying reopening of the Reynolds Metals plant at Longview, Wash., which has been closed for about a year. The plant hopes to get back into production by midsummer.

Kaiser Pipe Mill Producing

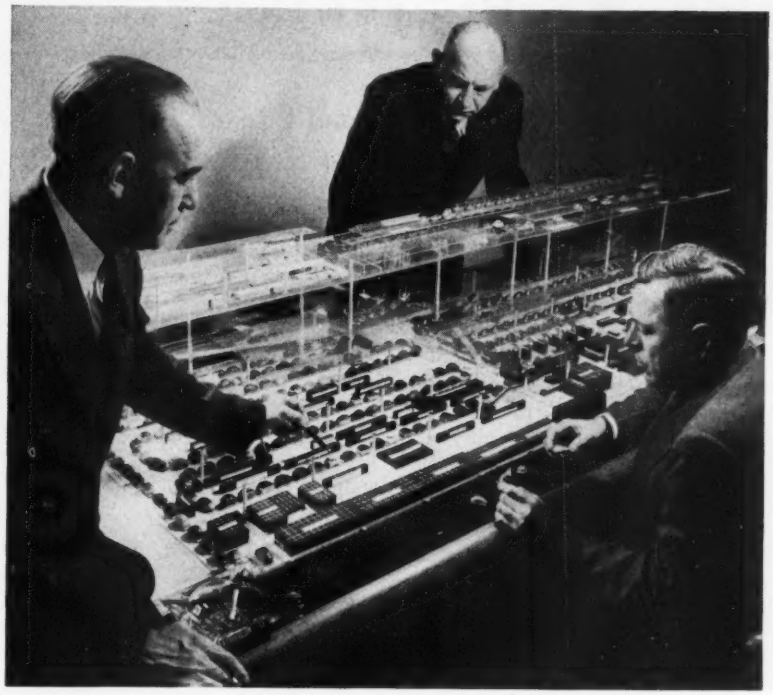
Kaiser Steel Co.'s new pipe mill at its Fontana, Calif., steel mill has started production. Both black and galvanized pipe will be produced by the Fretz-Moon butt-welding process.

The new mill, which is part of Kaiser's program to expand the Fontana pant, has a capacity of between 90,000 and 125,000 tons of pipe annually. The new mill is the first of its kind west of the Mississippi.

More U. S. Steel Stockholders

Expansion of U. S. Steel Corp.'s operating facilities in the Far West is being matched by increases in the number of stockholders of the corporation in the western states.

At the end of last year residents of the 11 western states held 676,683 shares of common stock compared with 667,836 shares a year earlier, while preferred stock holdings increased to 193,427 shares from 186,779. A majority of these holdings were in California.



ANOTHER WESTERN AUTO PLANT: This model of the new Fisher Body plant at Van Nuys, Calif., was on display last week during opening ceremonies at the new Chevrolet Los Angeles plant. So detailed is the scale model that nearly 500 miniature bodies on the assembly line are in their proper cycle as to body models and color, including two-tone jobs. Studying the layout are, left to right: J. J. Cronin, general manufacturing manager of Fisher Body; L. T. Dalecke, general factory manager in charge of assembly plants; L. C. Goad, vice president of GM and general manager of Fisher

Coast Steel Capacity Up

Postwar problems of the steel industry were discussed by J. Lester Perry, president, Columbia Steel Co., U. S. Steel subsidiary, at a dinner meeting Feb. 13 of the Los Angeles Purchasing Agents Association.

Mr. Perry reviewed the industry's development and improvement programs, pointing out that of the $500 million United States Steel has appropriated in its programs, more than $120 million is earmarked for the western states.

The industry's development programs, he said, will bring steel-producing capacity west of the Rockies up to about 3 million net tons of finished steel annually, or more than three times the 900,000 net tons of finished steel available before the war.

He expressed confidence that new western markets will be retained, but warned that manufacturers will have to be alert to improving their products and developing new products when competition returns.

In the matter of exports, Mr. Perry gave American Iron & Steel Institute statistics showing that steel exported by producers in 1946 and 1947 represented 6.5 per cent of total steel production. Before the war (during 1937 to 1939) 7.2 per cent of total steel produced was shipped abroad by steel companies. On the basis of total steel production, producers are exporting proportionally less steel today than in the immediate postwar years.

Diversion of steel to essential pipelines for transporting gas, oil and water was given by Mr. Perry as one of the reasons which has kept other consumers from getting as much steel as they would like to have.

Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

Hundreds of manufacturers and business firms must pay new District of Columbia franchise tax by Apr. 15 on business they did in the district during 1947

CONSIDERABLE uproar has developed in Washington over the new District of Columbia franchise tax under which hundreds of outside manufacturers and business firms must pay tribute to the district tax collector by Apr. 15 on business they did in the district in 1947.

This includes not only the companies which maintain Washington offices and which, because they paid the old income tax that prevailed prior to Jan. 1, 1947, have received copies of the forms that must be filled in and returned when the tax is paid. The liability extends also to many companies that have no Washington offices or representation, but who get business in Washington as a result of salesmen's occasional visits there. That is, the tax must be paid by many companies who so far have received no direct information about it.

Must Inform Themselves—Hence, to keep out of trouble with the District of Columbia tax collector, all companies who did business in the district in 1947 are advised to inform themselves. There is the law itself—Public Law 258, 80th Congress. Also there are two forms—D-20 for incorporated and D-30 for unincorporated businesses. In addition there are instruction sheets for each of these forms, and there also is a booklet of regulations under which the tax is administered. Copies of this material may be had from G. M. Thornett, secretary, Board of Commissioners, District of Columbia.

Congressmen from all the industrial states have received protests against giving the right to the District of Columbia to tax outside companies and one bill already has resulted. This bill, resulting from demands from the furniture manufacturing industry in his state, was introduced Feb. 9 by Rep. Howard W. Smith (Dem., Va.). It would repeal that portion of Public Law 258 empowering the district to collect taxes from outside interests.

Another Question Raised—The new franchise tax also has raised the question of just how far the district can go in taxing business with the government. So far the district authorities have expressed no intention of bearing down on government suppliers any more heavily than on other business. But there are fears that the law may not provide sufficient protection should the district, possibly hard pushed for funds at some later date, decide to launch a tax drive on suppliers to the government.

From a reading of all the material on this tax, it should cause no great surprise if district authorities eventually reach the conclusion that they are empowered to collect a tax on any business solicited or negotiated in Washington even though the goods, for example, might originate in Chicago and be shipped to the Mare Island Navy Yard.

Instructions Not Explicit—It is unfortunate, for instance, that this statement in the instruction sheet for Form D-20 is not more explicit: "Income from the sale of tangible personal property to the United States shall be allocated and apportioned in the same manner as any other income."

So far, as indicated above, there is no intention to tax business that is not purely district business, and there is no intention to exploit suppliers to the government.

STEEL TAXES

During the 12 years, 1935-46, tax collectors received more money from the steel industry than the industry earned as net profits, according to the American Iron & Steel Institute. Industry tax payments in the period totaled over $3,737,000,000, whereas the industry's profits totaled about $2,243,000,000. Average annual tax payments were $311,000,000, while average annual earnings amounted to $187 million.

Three-quarters of the taxes were paid during the five war years 1941-45, and the industry earned about 50 per cent of its 1935-46 profits during the same five-year period.

Lists Business Activities—"Among the acts which constitute engaging in business in the district," the instructions say, "are the following: (a) Performing services within the district, for either the United States, the District of Columbia, or others; (b) selling or renting real estate, and renting personal property located in the district; (c) having a stock of goods in the district in a store or warehouse, or on consignment, from which sales and deliveries are made to the United States, the District of Columbia, or others; (d) solicitation of orders for the sale of property, when the soliciting activity is regular and sustained. Personal solicitation of orders made on planned periodic visits to the district constitutes regular and sustained soliciting activity."

In other words, the tax collector has wide latitude for determining what business organizations can be made to pay a franchise tax.

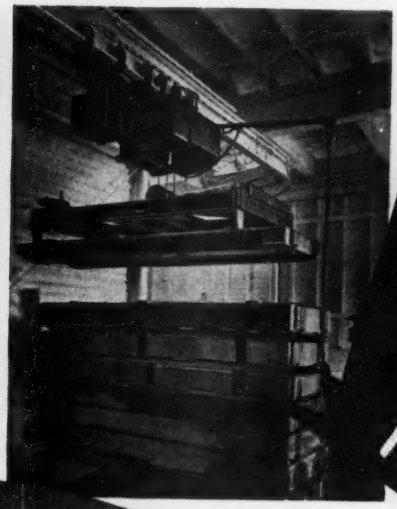
The tax is 5 per cent of the net income from the sale of goods located in the district to buyers in the district, or buyers outside of the district who take title in the district. It is also 5 per cent of the net income from the sale of goods located outside the district to buyers in the district who take title in the district.

The tax is 5 per cent of half the net income from the sale of goods located in the district to buyers outside the district when the deal resulted from solicitation in the district, even though title to the goods sold may have been passed outside the district. It is also 5 per cent of half the net income from the sale of goods outside the district to a buyer in the district, and where the sale of goods resulted from solicitation in the district.

Authorizes Exemptions—The law authorizes certain exemptions from the franchise tax. An unincorporated business, such as a partnership, is exempt if more than 80 per cent of its gross income is derived from personal services; under this provision lawyers are exempted as a class. Also, an unincorporated business is permitted an exemption of the first $10,000 of its net income. Interested companies should study the tax.

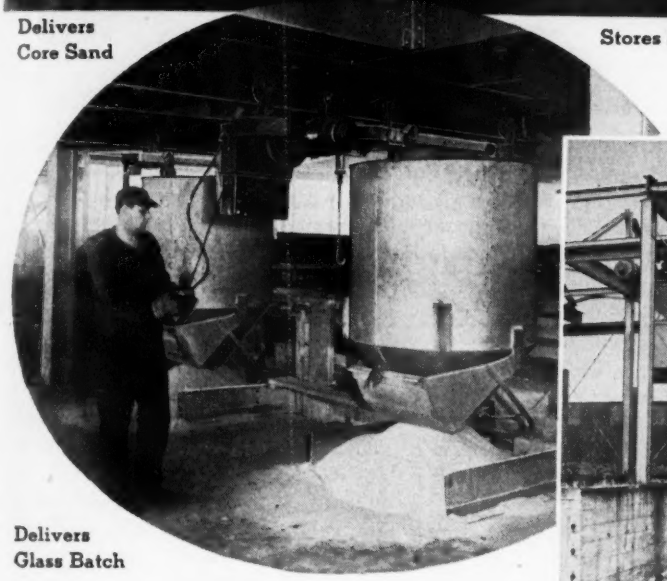
The law is complicated. The D-20 form for corporations comprises four 8½ x 17¼-inch pages—to be filled in with a vast amount of informa-

Delivers
Core Sand

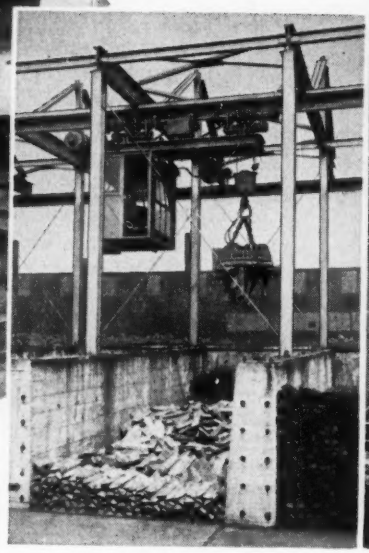


Stores Sheet Steel

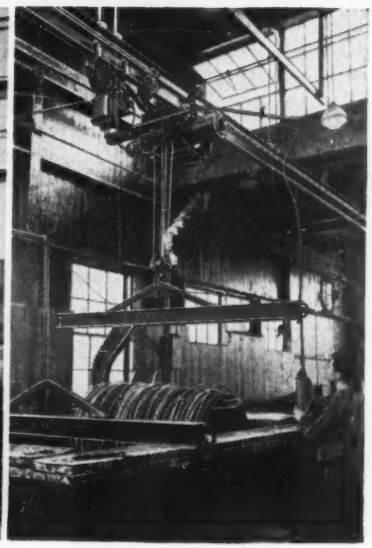
MONOTRACTORS Do the Hard Jobs



Delivers
Glass Batch



Stores Pig Iron



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tion such as detailed balance sheets, cost of goods sold, cost of operations, capital gains and losses, salaries of officers, bad debts, contributions, depreciation, etc. This information must be shown for the corporation's total business, with a breakdown to cover the portion of its business subject to the District of Columbia franchise tax.

The name "franchise tax," incidentally, springs from the concept that it is a tax paid in return for the privilege of doing business and collecting income in the District of Columbia.

The new franchise tax does not relieve businesses from the necessity of buying a license to do business in the District of Columbia, and this of course applies to those doing business with the government as well as others. The license costs $10 per year and must be purchased by each business entity whether it is a corporation, an unincorporated business or an individual. Companies which do not have a Washington office or Washington representation but who send in their sales representatives at intervals are obligated to buy a license.

OPPOSES OUTLAWING COMMUNISTS: Attorney General Tom Clark, center, voiced opposition to proposals to outlaw the Communist party in testimony before the House un-American Activities subcommittee. Mr. Clark is shown here with two committee members, Rep. Karl E. Mundt, (Rep., S. Dak.), left, and Rep. Richard M. Nixon (Rep., Calif.), right. NEA photo

Congress Getting Tough

Increasing tendency of Congress to get tough in legislating the European Reconstruction (Marshall) Plan was demonstrated by the action of the Senate Foreign Relations Committee in accepting an amendment by Sen. Henry Cabot Lodge (Rep., Mass.) under which transfer of strategic raw materials from the 16 European nations to the United States would be "by sale, barter, or otherwise," as one of the conditions of American aid.

Administration spokesmen have taken a consistent attitude that "swapping" of goods with Europe was undesirable in that Europe needs all her production for her own reconstruction and that where Europe ships goods to us we should pay in dollars so that Europe may use the dollars to further improve her economic position. In line with this thinking, the administration's draft of the ERP bill, as submitted to Congress last December, had a provision for "facilitating the sale" of strategic materials to the United States for purposes of stockpiling.

Under the amendment accepted by the committee, there will be some payment by barter by the European countries if the administrator of the program asks for such arrangements and the nations involved see their way clear toward acceptance. The amendment is aimed especially at obtaining by barter some of the materials produced in the British, French, Belgian and Dutch colonial possessions and so badly needed in the United States for stockpiles.

Another amendment accepted from Senator Lodge directs the ERP administrator to encourage the use of coal-burning rather than oil-burning industrial equipment in Europe, and also the purchase of oil for Europe from non-American sources.

The committee expects to have its bill ready for debate in the Senate by Mar. 1. House action probably will be held over until the Senate has acted.

Illegal Employment of Minor

In the first Public Contracts Act enforcement case which was contested in a federal court, Secretary of Labor L. B. Schwellenbach recently announced full satisfaction of judgment for $950 obtained against a Denver, Colo., manufacturer who had refused to pay liquidated damages in that amount to the government for illegal employment of a minor in violation of the act.

The case arose out of the firm's performance on two government contracts, for $30,000 and $28,000, for fabrication of waterproof bedding rolls for the Army during the war. Inspection of the establishment by the Wage & Hour and Public Contracts Divisions of the U. S. Department of Labor revealed that a boy under 16 years of age had been employed in violation of the Public Contracts Act for a total of 95 days.

The act requires payment of $10 for each day of such illegal employment be made to the government as liquidated damages.

Oppose Reorganization Plan

The bill to reject the President's Reorganization Plan No. 1 is on the House calendar with an adverse report from the House Expenditures Committee; 14 Republicans voted against and 8 Democrats for the plan. The House is expected to disapprove the plan, but the nature of Senate action is uncertain.

A limited number of industry spokesmen appeared before the committee to express opposition. By its very nature, they pointed out, the Labor Department is biased on the side of labor, so that employers would not like to see the United States Employment Service and the Bureau of Employment Security (the latter now is in the Federal Security Agency) permanently placed in the Labor Department.

Among witnesses who opposed the plan were Frank C. Manak, American Steel & Wire Co., Cleveland; Porter Dale, Youngstown Sheet & Tube Co., Youngstown; and Harold Boyce, Clark Equipment Co., Buchanan, Mich.

Canada Building Boom Crimped

Drain on dollar reserves by record-breaking level of investments in new productive capacity forces import regulation. Steelworks expansions planned

TORONTO, ONT.

CANADA now is in the middle of the biggest investment boom in history, but "we are consequently forced to consider it, however desirable it may be from other points of view, as one of the chief contributors to our United States dollar shortage," C. D. Howe, minister of trade and commerce, stated recently.

Last year, he said, Canada invested $2300 million in buildings, machinery and capital improvements and estimates indicate Canadian business and government plan to spend $2700 million in 1948 for capital improvements, an increase of 17 per cent.

He pointed out that the present wave of investment is fundamentally encouraging as evidence of the industrial growth of Canada and as a tangible indication of the country's new position in the world trading system.

Expansions To Be Selective—This investment, however, is involving unprecedented amounts of United States dollar imports. Almost every capital project in Canada has, directly or indirectly, a United States dollar content. "On the average," he stated, "every dollar spent on construction in Canada involves some 30 cents in United States exchange. The government finds it necessary to take steps to regulate the high volume of imports we are now making for capital investment purposes and to achieve a degree of selectivity in our future expansion. The guiding principle of this selectivity must be our immediate and urgent necessity to conserve United States dollars and our long-run necessity to earn more United States dollars.

"Such programs as low cost housing and industrial development designed to produce United States dollars will have a high priority, but much of our current investment for commercial, service and amusement purposes can and must be deferred."

Steel Capacity Doubled — Speaking of the steel shortage in Canada, Mr. Howe stated: "Canada is just beginning to roll. My most difficult task for the past several months has been the distribution of Canada's limited steel production. It is difficult to believe that our steel industry, which was doubled in wartime, can be wholly insufficient to supply postwar requirements, but that is the situation."

Canada's steel industry, according to H. G. Hilton, president, Steel Co. of Canada Ltd., under pressure of demand for steel during the war years, made an enviable record in expanding production capacity. In 1942 output of steel ingots and castings rose to 3,110,000 net tons, two and a quarter times as much as in 1939. No country in the world has matched this performance—the peak increase over 1939 in the United States occurred two years later than in Canada, in 1944, and equalled 70 per cent.

Canadian output in every year since 1942 has also been remarkably high, except in 1946 when a strike deprived the country of many thousands of tons of much-needed steel. For 1947 output of steel ingots and castings amounted to almost 3 million tons.

In the last five years, 1943 to 1947 inclusive, 14½ million tons of steel were produced in Canada, compared with 6¾ million tons in the five years immediately preceding the war, 1935-1939, an increase of 111 per cent.

Practical Capacity Reached — Mr. Hilton points out that total ingot capacity, as compiled by the Dominion Bureau of Statistics, is placed at 3,245,000 net tons a year. In case this comparatively high figure should cause any misgivings about the full utilization of steelmaking facilities in Canada, it may be pointed out that it is theoretical and includes furnaces, some of them very old, which, for a variety of reasons, are not operated at all, or are not operated continuously.

The steel industry is still under government control, and it may safely be said that Canada is producing every ton of steel that is economically possible.

Facilities are being added which will have the effect of increasing ingot production. A bessemer converter has been placed in operation by Algoma Steel Corp., at the Soo, which will increase ingot production at that point and reduce the consumption of steelmaking scrap. New coke ovens are being erected at Sydney, N. S., with a normal capacity of 400,000 tons. Steel Co. of Canada has just placed in operation a new battery of coke ovens at its Hamilton works, and the company plans for another battery of coke ovens as well as an additional large blast furnace. Dominion Foundries & Steel Ltd., Hamilton, has recently announced plans for installing coke ovens and a blast furnace, representing an expenditure of some $15 million.

ERP Seen as German Salvation

DUSSELDORF, GERMANY

REGRESSION of the German economy toward stagnation appears preventable only through operation of the European Recovery Program, success of which is to large extent dependent upon industrial revival in the Ruhr.

Until action on ERP is taken, however, the production picture in Germany and in western Europe generally will remain far from bright. Currently, international politics, fear of revival of German competition in world markets, and other factors are acting to prevent working out a solution to Germany's problems.

In the German coal industry, for example, the cost of mining a ton of coal is now about 31 reichsmarks, but the mines receive only 16 to 17 marks per ton. Sold for export by the allied authorities, the coal brings about $21 or more per ton, the profit made being used to pay for the greatest part of Germany's food imports.

The loss sustained by the mines is covered by subsidies paid by the German treasury, as in the case of steel. A coal price increase of 8 reichsmarks per ton is pending with the allied control authorities, but this will be far from enough.

Export Trade Reopened—Occasional exports of steel will now be permitted by the British, unless the material is needed for important domestic projects. Holland and Sweden are negotiating for purchase of German steel and steel products in exchange for needed raw materials. Interestingly, Germany had booked large orders from Denmark and from Holland for stoves and ranges, particularly in the large sizes, but these countries, which are limited in their amounts of dollar exchange, were forced to cancel the orders because Germany may export for dollars only.

Allocation of steel to German metalworking industries has been pitifully small, only 600,000 tons having been granted during the first nine months of last year.

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By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Extensive changes underway at Rouge and Lincoln plants as Ford prepares to introduce three entirely new lines of passenger cars. Rouge Mercury line down

DETROIT

BIG DOINGS are under way at the Rouge and Lincoln plants of Ford Motor Co. and from now on until probably about the first of June there will be an almost continuous reshuffling of equipment, machines and conveyors, not to mention personnel, until the three entirely new lines of passenger cars have been labored into production. The shift represents probably the most difficult and all-encompassing change ever attempted by the company and from somewhere on high the shade of the elder Henry Ford must be looking on in amazement at the reworking of his empire.

Final assembly line for Mercury models at the Rouge plant ground to a stop Feb. 13. It carries 500 bodies and has a complement of 640 assemblymen, half of whom will be laid off anywhere from a few days to three weeks, the balance being transferred to work on the Ford lines, to maintenance detail or to production of parts for storage. Components for the new Mercurys began arriving last week and were routed quickly to an initial schedule of 1000 pilot models.

Changes in bodies require more time to absorb than revisions in the chassis, so a head start has been made in the Pressed Steel Division, where dies were spotted in presses and tried out in advance of closing the assembly line on the last of the 1948 models. Motor building, foundry and foundry machine shop will continue their approximate employment levels of the present until the changeover on Ford models, likely to begin next month. The temporary dip in Mercury requirements will be evened out by stepping up production of truck and service engines. Five branch plants will continue to assemble Mercurys until Mar. 1.

Steel Production Continues—Steel plant and glass manufacture will continue uninterrupted during the changeover, thereby permitting a considerable bulwarking of inventories of steel and glass. A slight slowing in open-hearth production may be in order to permit diverting more pig iron to the foundry, although if foundry output is cut back it would be necessary to pig the blast furnace metal, since present practice is to deliver hot metal direct to the foundry cupolas. In recent weeks, the production foundry has been screaming for more iron, to not much avail. Meanwhile, open-hearth heats have been booming, with better than 17,000 tons of ingots poured weekly.

Ford has issued calls for men experienced in electrical construction, pipefitting, rigging, structural steel work, bricklaying or hydraulics, to assist in the herculean task of installing new machinery and relocating present equipment.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1947	1946
January	366,205	109,890
February	393,636	101,656
March	443,588	134,072
April	445,137	229,888
May	404,191	263,445
June	421,466	217,943
July	400,944	315,966
August	364,478	358,446
September	444,501	339,774
October	461,536	406,572
November	417,493	389,645
December	488,114*	393,239
12 mos.	5,051,289	3,260,536

* Preliminary.

Estimates for week ended:

	1948	1947
Jan. 31	101,044	94,114
Feb. 7	82,717	89,958
Feb. 14	85,262	97,276
Feb. 21	94,000	103,400

Estimates by Ward's Automotive Reports

Long-Term Recasting Probable—At this point it is of interest to consider for a moment the overall Ford picture, particularly from the long-range view. While the changeovers now starting are enormous in extent, they may even be surpassed by the recasting of Ford operations over the next five years. To anyone who has not seen first-hand the vast stretches of the 1200-acre Rouge plant in Dearborn, it is just impossible to describe the breath-taking size and scope of the property. However, spectacular size does not always make for the most efficient operation, a fact which the present Ford management is giving some careful consideration.

Property for the Rouge plant was acquired in 1915 and first construction involved docks along the river slip, completed in 1917. Sawmill and coke ovens were built in 1919, blast furnaces and production foundry in 1920, electric furnace and plants in 1923, cement plant and motor building in 1924, pressed steel and spring and upset buildings in 1925, open-hearth furnaces and rolling mills the same year.

The two blast furnaces have rated capacity of better than 500,000 net tons annually, and a third 1400-ton furnace now has foundations in place, with operation scheduled by fall. The 183 by-product coke ovens have annual rated capacity of 1,260,000 tons. Ten open-hearth furnaces, one a 400-ton so-called mixer furnace, were rated in 1945 at 770,000 tons annual ingot pour. Some of these are now being enlarged and improved. Thirty-one electric furnaces have annual capacity of 197,320 tons. Finished steel capacity, according to official 1945 figures, includes 320,000 tons of hot-rolled bars, 465,000 tons of hot-rolled sheets, 182,000 tons of cold-rolled sheets and 186,000 tons of hot-rolled strip. Additional strip rolling capacity has been installed since, and it has been proposed to acquire and rebuild a skin pass reversing cold mill from Granite City Steel Co. to process 84-inch sheets.

Steel Mill May Be Sold — This makes a neat steel mill package, and characteristic of all Ford properties, has been kept in near-perfect condition. Some day it is going to be offered for sale, if inside opinion around Detroit can be credited. Not at the moment, of course, when auto companies and parts makers are scrambling for steel, but probably for sure in the near-term future.

The iron and steel production facilities are located so that they could easily be fenced off from other operations at the Rouge, without requiring the removal of any buildings or relocation of much equipment. For some steel company which would give its eye-teeth to own producing facilities at the back door of the profitable Detroit market, obviating the nec-

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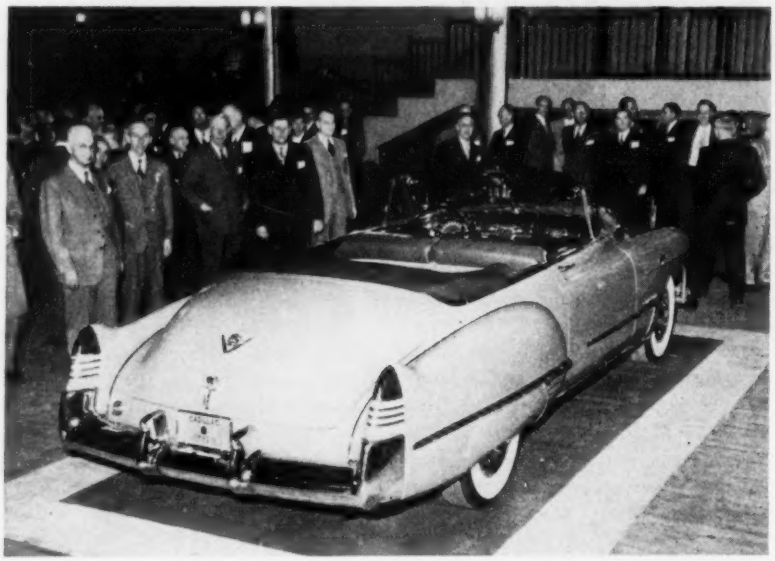


NEW CADILLAC: Convertible model of the 1948 Cadillac exemplifies the postwar styling trend, is long, low and wide. NEA photo

essity for absorbing heavy freight charges on long hauls, say from the East, the Ford steel plant is a natural. At today's prices it should be worth, conservatively, $100 million.

Plans Pretentious—Sales and production ambitions of the new Ford-Mercury-Lincoln lines are pretentious. Ford's avowed purpose, of course, is to outsell Chevrolet. On the other hand, Lincoln-Mercury is setting out merely to double its 1947 production, or to build 250,000 cars, representing a sales volume of $400 million. Benson Ford, personable 28-year-old younger brother of Henry Ford II, recently appointed director of the L-M Division, disclosed some of the planning at his recent initial meeting with the press.

Lincoln-Mercury has been cut away cleanly from the Ford organization as far as sales and production area are concerned. Three new assembly plants will be operated, at Metuchen, N. J., St. Louis and Los Angeles, supplemented by the Detroit Lincoln plant and the Mercury line at the Rouge plant. A dealer organization of 1061 is now functioning and plans call for adding another 600 this year. Current order backlogs cover 154,000 Mercury and 24,000 Lincoln models. The 1949 models will be presented to the public in April. Overall investment in new plants, tools, dies and related equipment for the L-M project comes to $75 million.

UAW Charges Coercion

Some interesting angles present themselves in connection with charges of "coercion and intimidation" which the UAW-CIO has leveled at General Motors Corp. in connection with an extended and improved group insurance plan the corporation offered its employees, to become effective Feb. 1. The plan was called off after the union filed a complaint with the NLRB which acquiesced and asked the courts to restrain GM from activating the insurance. It remains a moot question whether group insurance, which GM has had in effect for a good many years, is a matter for collective bargaining. A hearing was concluded here last week on the case before an NLRB examiner.

Meanwhile the UAW has been holding conferences with two of the Roosevelt brothers who are in the insurance business, presumably with the idea of arranging a group insurance plan of their own to sell the union membership, (perhaps with a little coercion and intimidation), premiums to be paid by the employer.

Kaiser-Frazer Sues Otis

Automotive circles are pondering the implications of the $7,762,500 suit filed by Kaiser-Frazer Corp. against Otis & Co., Cleveland investment house, for alleged repudiation of stock-purchase contracts.

For the present, it appears the K-F proposal to sell 1,500,000 shares, to net slightly more than $17 million intended to be used to boost K-F production from about 1000 to 1500 cars a day, is off.

In its suit, K-F charges Otis repudiated a contract to buy 337,500 shares of the company's common stock at $3,881,250, that Otis induced the First California Co. of San Francisco to call off a contract in similar amount, and "inspired" a court action by a K-F stockholder to halt issuance of the new shares.

Otis retorted that it had withdrawn as result of the refusal of K-F directors to reimburse the auto manufacturing concern for $2,500,000 it spent in buying its own stock to stabilize the market price before the new issue was offered.

Gas Service Resumed

The industrial gas shortage terminated last week as service was restored to 95 plants which had been cut off from supplies for nearly three weeks. At the height of the furor over the extensive shutdowns, the UAW-CIO characteristically stepped forward with "a plan." It seems the union had got hold of one L. C. Karrick, a chemical engineer who has worked with various governmental agencies and the inventor of a process for converting coal to gas, oil and whatnot. Taking the figure of 12 million tons of coal, approximate annual consumption in the Detroit area, Karrick says he can convert this to 24 billion cubic feet of gas, plus 8½ million tons of a smokeless solid fuel, plus 310 to 430 million gallons of crude oil, plus 1.2 billion kilowatt-hours of power, plus coal tar by-products.

Playboy Exhibited

Hand-built samples of the Playboy automobile were shown here recently, a 4-cylinder, three-passenger, single-seat convertible model on 90-inch wheelbase, with 155-inch overall length and powered by a 40-horsepower Continental engine. The design features an all-steel, counterweighted, retractible top which can be raised or lowered quickly, as well as an integrally welded body and frame. Hydraulic brakes, four coil spring and standard although smaller types of mechanical components are used on the car which is planned for sales at $985, fob Buffalo, by its builder, the Playboy Motor Car Corp. Body and frame structure, of 20-gage steel, is made up of 48 sections, assembled by welding.

The company was organized late in 1946 by Louis Horwitz, Charles D. Thomas and Norman W. Richardson. It is now seeking to buy the wartime aircraft engine plant in Tonawanda, N. Y., formerly operated by Chevrolet, having delivered a letter of intent to purchase the structure for $2¼ million—$500,000 down and the balance over ten years.

thread checking time and costs *Reduced!*

Only two instruments are required in many plants to solve external thread checking problems—Sheffield's new Adjustable Leadchek and the Sheffield Visual Gage with thread checking accessories. Checking is quick, accurate and inexpensive.

Write for detailed information on these instruments—and for other thread gages not illustrated.

1 **NEW ADJUSTABLE LEADCHEK** for range of 4½ to 60 threads per inch and for work up to 2" in diameter, equipped with a "tenth" dial indicator for production use or with an "Electrigage" for the toolroom where tolerances are as close as .0001". Write for Inst. No. 27.

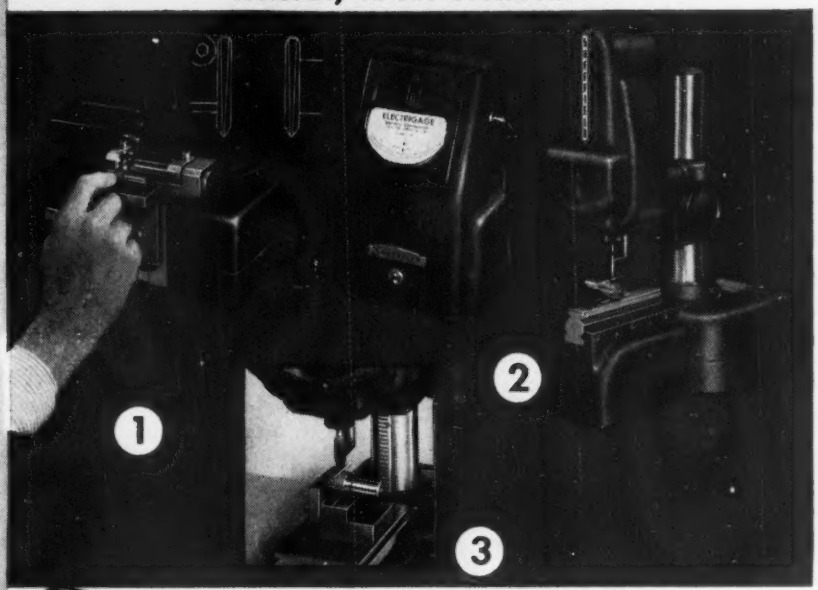
2 **VISUAL GAGE** with thread checking attachment for three wire checking of PITCH DIAMETER. Write for VG-500-45.

3 **SINE BLOCK** used with Visual Gage for checking MAJOR DIAMETER, PITCH DIAMETER and TAPER of tapered pipe threads up to 3" in diameter. Write for VG No. 4.

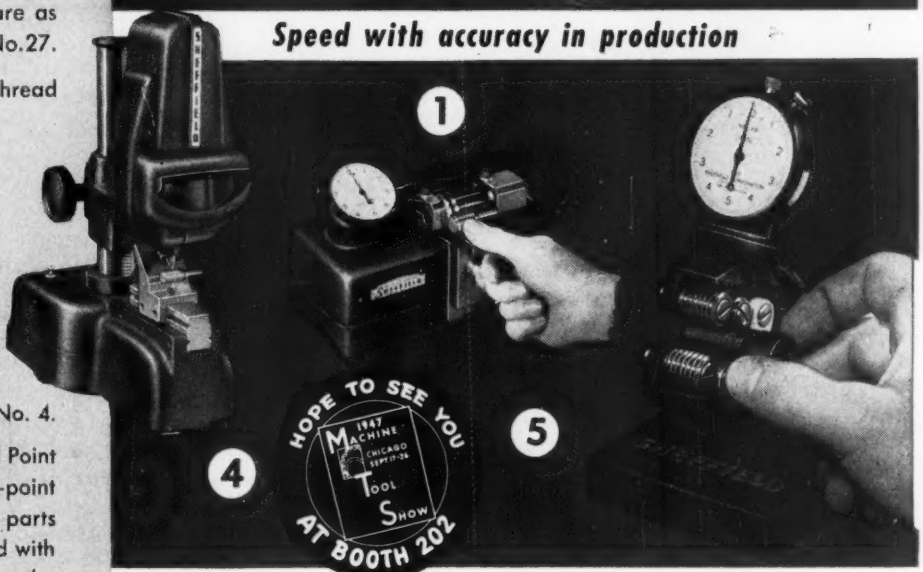
4 **VISUAL GAGE** with Ball Point Accessory for a rapid 2-point check of PITCH DIAMETER of parts up to 1" nominal diameter and with an accuracy comparable to the three wire method. Parts up to 2" can be handled with larger accessory. Write for VG No. 2.

5 **THREADCHEK** for the rapid inspection of LEAD, PITCH DIAMETER, THREAD ANGLE, ROUNDNESS, TAPER and STRAIGHTNESS, especially for studs, bolts and other threaded elements produced in large volume. Write for Inst. No. 10.

Accuracy in the toolroom



Speed with accuracy in production



Chek with SHEFFIELD on thread inspection equipment

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Refractories Firm To Make Basic Brick

EXPANSION of its Maple Grove, O., plant to provide facilities for the manufacture of basic brick used in lining and relining rotary kilns, industrial furnaces and in basic open hearth and electric steel furnaces, is planned by Basic Refractories Inc., Cleveland.

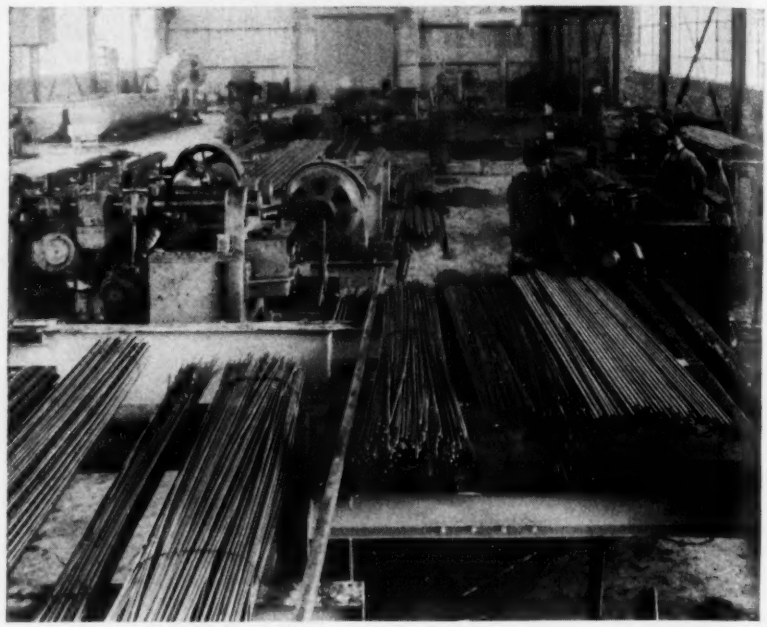
The new facilities, costing an estimated $325,000 and expected to be ready for operation by the latter part of 1948, will mark a change in the company's production history, according to Howard P. Eells, president. Heretofore it has concentrated on the manufacture and sale of granular dolomite, magnesia and chrome refractories used for furnace maintenance and repair in the steel industry.

Expansion Backed by Research—Company's decision to expand into the basic brick field stems from more than 20 years of research and development and from experience gained in the continuous operation of a pilot brick plant for about 10 years. Output of the pilot plant has been used principally to line the section of its own rotary kilns in which temperatures well above 3000 degrees fahrenheit are employed.

Manufacture of basic brick on a commercial scale has long been contemplated by Basic, Mr. Eells said, and much of the needed equipment for a brick plant had already been purchased prior to World War II. Plans were shelved, however, to permit concentration on the company's Las Vegas, Nev., magnesium project and on the task of increasing granular basic refractory output.

Tests Made—Large scale tests of the brick production of Basic's pilot plant have been made in rotary kilns used to make portland cement and in the hearths of industrial heating furnaces, such as forge furnaces. A large part of the production of the new plant is expected to be used in the cement industry and by companies employing furnaces for heating steel prior to forging, forming and other preliminary operations. This Ohio brick plant will be the only one of its kind in the midwestern area, Mr. Eells pointed out. Manufacture of basic brick of this type is now largely confined to the Baltimore-Philadelphia section.

In addition to the rotary kiln and heating furnace brick, Basic plans eventually to make a line of basic brick, fired and unfired, for use in the open hearth and electric furnace industry.



STRAIGHTENING MACHINES: New plant of the Precision Drawn Steel Co., Camden, N. J., has recently gone into production with a capacity of 50,000 tons of cold-finished steel a year. Construction got under way last May and the plant as now completed and in operation comprises 50,000 square ft of floor area, with equipment installed for straight line production of a full range of standard sizes and special shapes. Photo shows straightening machines in the new plant

Anderson Stove Plans To Quadruple Output

Anderson Stove Co., Anderson, Ind., expects to quadruple production of gas ranges at the Anderson plant it recently purchased from War Assets Administration.

The plant, whose floor area of 200,000 sq ft is four times the size of present production facilities used by the company, has been equipped with $750,000 worth of new equipment, according to John T. Mascuch, president of Anderson and of Breeze Corporations Inc., the parent organization.

Automatic handling techniques and assembly line production will be used at the facility which consists of several buildings on 14-1/2 acres. Production at Anderson is expected to be accelerated further by manufacture of parts by Breeze at its Newark and Elizabeth, N. J., plants.

Timken-Detroit Acquires Link-Belt Stoker Division

Timken-Detroit Axle Co., Detroit, has acquired the Stoker Division of Link-Belt Co., Chicago, Walter F. Rockwell, president of Timken-Detroit, announced last week.

Since 1933 Link-Belt has manufactured a full line of stokers, both hopper and bin-fed, for domestic, commercial and industrial uses.

Link-Belt Stoker Division's manufacturing, sales and service organization will continue to function under the supervision of the Timken Silent Automatic Division, Mr. Rockwell said. This division makes oil burners, oil and gas furnaces and boilers, water heaters and other related products. Plants of the Timken Division are located in Jackson, Mich., and Oshkosh, Wis.

Discuss Better Output at Pressed Metal Meeting

The achievement of increased production and improved products through developments in press design was discussed by E. A. Irwin, vice president in charge of sales, E. W. Bliss Co., at a recent Detroit meeting of the Michigan District, Pressed Metal Institute.

Mr. Irwin also considered the problems of design, construction and operation of presses and acted as moderator at a roundtable discussion of press room problems.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

H. K. Ferguson Co., Cleveland, industrial engineering firm, did the greatest volume of business in its 30-year history during 1947. The volume surpassed even wartime highs.

—o—

Davies & Thomas Co., Catasauqua, Pa., foundry firm specializing in production of tunnel segments, has been taken over by new interests and will operate under the name of Davies & Thomas Inc. New officers include James T. Duffy Jr., chairman and treasurer; Norman Esibill, president; and Milton Knauss, plant manager.

—o—

Massachusetts Institute of Technology, Cambridge, Mass., announces it has received a $250,000 grant for atomic research and training of nuclear scientists from Texas Co.

—o—

American Washer & Ironer Manufacturers' Association, Chicago, reports that 3,783,632 standard-size household washers were sold in 1947, an increase of 86.9 per cent over 1946 sales. Sales of ironers aggregated 599,258 units, an increase of 380.8 per cent over the figure for 1946.

—o—

Whitney Chain & Mfg. Co. and **Hanson-Whitney Machine Co.,** both of Hartford, Conn., have been merged into Whitney-Hanson Industries Inc. Each company will act as a division of the new corporation. Whitney will continue to manufacture roller and transmission chains and other products, while Hanson-Whitney's line of machine tools will be retained.

—o—

John S. Barnes Corp., Rockford, Ill., manufacturer of hydraulic structures, pumps, controls and fluid power units, has appointed H. E. Stone Supply Co., Oaklyn, N. J., as its sales representative in metropolitan New York, New Jersey, Delaware, Maryland and eastern Pennsylvania.

—o—

Gibson Refrigerator Co., Greenville, Mich., has purchased the Belding, Mich., plant and warehouse of Murray Corp. of America. New facilities, comprising 150,000 sq ft of space, will be used to boost production of refrigerators and electric ranges.

—o—

American Brake Shoe Co., New York, reports approximately 9000 employees, representing 95 per cent of those eligible, have enrolled in the company's new comprehensive insurance plan adopted Feb. 1. Insurance provides protection for non-occupational sickness and benefits.

—o—

Visible Index Corp., New York, manufacturer of business machines, has added the Tri-Poster, a multiple posting machine, to its line as result of purchase of all rights concerning it from Cummins Business Machines, Chicago.

—o—

St. Louis Chamber of Commerce, St. Louis, has published a directory of manufacturers in the city.

—o—

Pressed Steel Car Co. Inc., Pittsburgh, has consolidated into one office at Chicago its freight car sales offices formerly in Pittsburgh, New York and Chicago.

—o—

Southern States Iron Roofing Co., Savannah, Ga., sold 95 million sq ft of aluminum roofing in 1947, or 60 per cent more than in the preceding year.

—o—

Lustron Corp., Columbus, O., has placed additional orders totaling over $2 million in plant equipment for production of porcelain enamel steel homes. Largest orders were placed with Denly Machine Specialties Co., Chicago, for an 1800-ton press; Albert J. Boland Co., St. Louis, for special furnaces; and Spray-Con Co., Chicago, for a cleaning, spraying and baking system.

—o—

Palmer Mfg. Corp., Phoenix, Ariz., manufacturer of heating equipment, has adopted a policy of absorbing all freight charges on its equipment delivered anywhere in the United States.

—o—

War Assets Administration is offering nearly 30 miles of railroad trackage at the Sangamon Ordnance plant near Illiopolis, Ill., for sale on a competitive bid basis. Purchasers must remove the trackage from the site.

—o—

Bureau of National Affairs, Washington, has published an encyclopedia of wage rates and schedules now in effect throughout the nation.

—o—

Bureau of Mines has published reports on a zinc deposit in Pennsylvania and on lead, zinc, silver, copper and bismuth deposits in Utah.

—o—

Reltool Corp., Milwaukee, has acquired 40 per cent of the capital stock of Pohl Tool Co., Detroit. Pohl Tool will operate as an affiliate of Reltool and provide additional manufacturing capacity for Reltool's line of metal cutting tools.

—o—

Hoppenstand Industries Inc., Greenville, Pa., plans to build a small automobile to sell for approximately $500. To be called the Gregory, the car will have an aluminum body and a two-cylinder engine mounted in the rear. Production is expected within a few months.

—o—

Moore Division, Joliet, Ill., Conlon-Moore Corp., has begun quantity production of smokeless coal heaters.

—o—

Consolidated Industries Inc., Lafayette, Ind., has introduced a new type oil burner which converts oil into gas and averages better than 90 per cent efficiency. Manufacturer expects use of the burner in small homes can reduce oil consumption by as much as 50 per cent.

—o—

Budd Co., Philadelphia, has announced receipt of an order from Santa Fe Railway for 27 all-room type sleeping cars.

—o—

Gray Iron Founders' Society Inc., Cleveland, has endorsed a method of rating the full output of a gray iron foundry on the basis of "maximum commercial demand." Each foundry would figure its 100 per cent practical output as the average of the best six consecutive months' shipments since V-J Day. Normal foundry output is expected to run about 65 per cent of such a maximum commercial demand over an eight or ten year business cycle.

—o—

American Foundrymen's Association, Chicago, has added four new chapters consisting of students from University of Minnesota, University of Missouri, Ohio State University and Massachusetts Institute of Technology.

—o—

Lukens Steel Co., Coatesville, Pa., has installed a sodium hydride descaling plant at a cost of $750,000. The Coatesville facility will be used on clad steels.

—o—

Croft Steel Products Corp., Jamestown, N. Y., plans a $500,000 plant in Houston, Tex., for assembly of steel window casements from parts manufactured in Jamestown. Firm also has plans for construction of a $1 million plant at Houston for manufacture of Croft products.

The Business Trend

DECLINING trend of industrial production, which had been evident since abnormally cold weather forced curtailment in the use of industrial gas and hindered movement of materials, was reversed in the week ended Feb. 14.

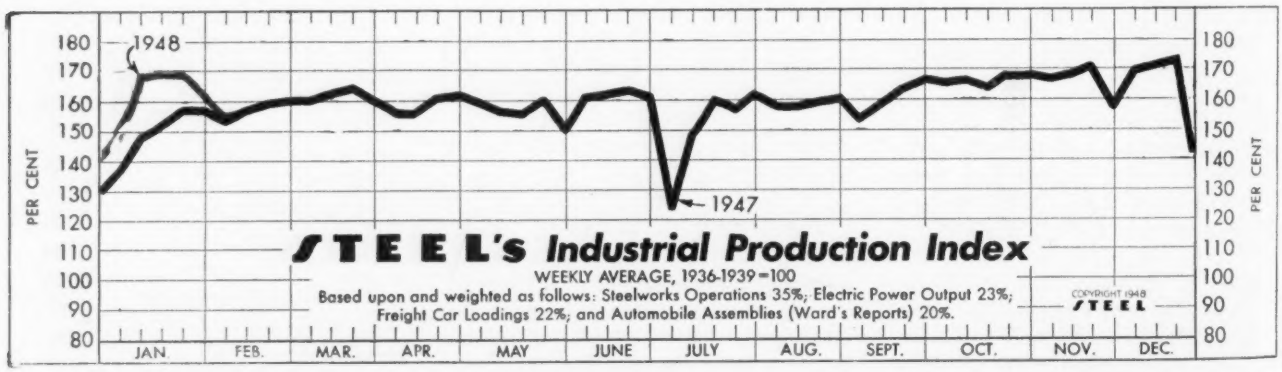
STEEL's industrial production index for that week registered a one point gain from the previous week at 159 per cent (preliminary) of the 1936-1939 weekly average, two points above the index for the comparable week of 1947. As yet, however, not all basic industries have shared in the partial recovery, but with restoration of gas supplies to industrial consumers and alleviation of transportation difficulties, a rebound to the high production rates prevailing before the cold wave may be expected.

STEEL — Most major steelmaking districts were forced to reduce operations further in the week ended Feb. 14, and the national ingot rate slid off one point to 93 per cent of capacity. Demand for steel has not eased despite recent curtailments in many metalworking industries, but with inventories built up during the period the tight steel supply situation may not prevent higher than normal production for some time after complete operations are resumed.

AUTOS—Slight gain in car and truck output was made in the week ended Feb. 14, when 85,262 units were produced in the United States and Canada, but shutoffs of gas to major manufacturing centers for three consecutive weeks has disrupted schedules and loss of production of components will hinder operations for some time. As an offset to this loss, however, the industry's steel stocks have been built up substantially.

PRICES—Emphasizing that its index of wholesale commodity prices for the week ended Feb. 7 does not show the effects of the recent break in prices in commodity markets, Bureau of Labor Statistics reports a 0.1 per cent increase to 163.8 per cent of the 1926 average. The bureau's daily index of spot primary market prices of 28 commodities traded in organized markets dropped over 7 per cent between Feb. 3 and Feb. 11, with seven domestic agricultural commodities showing a decline of 13½ per cent in that period. Preliminary estimates by the bureau place the consumers' price index for mid-January at a new postwar peak of 169 per cent of the 1935-1939 average, 1 per cent above the previous month.

SALES—Manufacturers' sales in 1947, estimated by the Office of Business Economics, Department of Commerce, at $169 billion, were one-third higher than in 1946. Substantial rises in prices plus some gain in physical volume were responsible. Both in aggregate value and percentagewise, sales by the durable goods industries rose more than the nondurables, the former accounting for $74.5 billion of the total. Year-end inventories of manufacturers were estimated at $23.7 billion, a rise of about $3.4 billion for the year. In view of higher price levels during the year, the gain actually represents a slackening in inventory accumulation as compared with 1946, OBE reports.



Index (chart above): Week Ended Feb. 14 (preliminary) 159 Previous Week 158 Month Ago 169 Year Ago 157

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	93.0	94.0	98.0	93.5
Electric Power Distributed (million kilowatt hours)	5,385	5,412	5,370	4,778
Bituminous Coal Production (daily av.—1000 tons)	1,920	1,890	2,300	2,050
Petroleum Production (daily av.—1000 bbl.)	5,347	5,332	5,326	4,758
Construction Volume (ENR—Unit $1,000,000)	$133.5	$123.8	$83.3	$54.8
Automobile and Truck Output (Ward's—number units)	85,262	82,717	109,031	97,276

* Dates on request. † 1948 weekly capacity is 1,802,476 net tons. 1947 weekly capacity was 1,749,928 net tons.

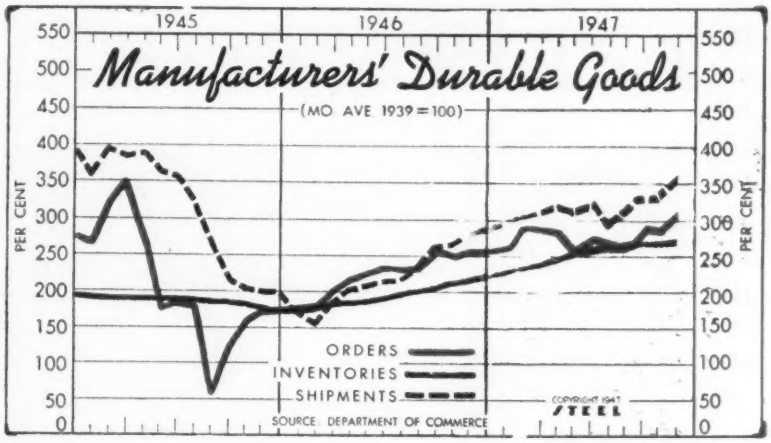
TRADE				
Freight Carloadings (unit—1000 cars)	770†	747	811	800
Business Failures (Dun & Bradstreet, number)	128	97	61	62
Money in Circulation (in millions of dollars)‡	$28,189	$28,124	$28,374	$28,346
Department Store Sales (change from like wk. a yr. ago)‡	+10%	+8%	+8%	+2%

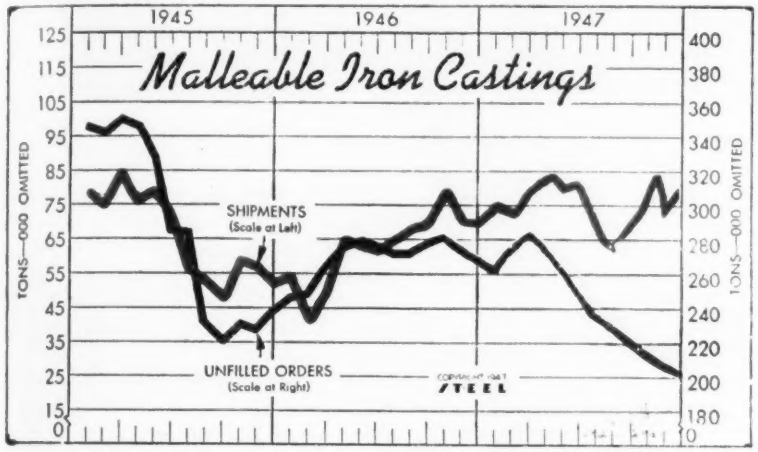
† Preliminary. ‡ Federal Reserve Board.

Index of Manufacturers' Durable Goods

(Mo. Ave. 1939=100)

	Orders		Shipments		Inventories	
	1947	1946	1947	1946	1947	1946
Jan.	270	176	292	169	226	171
Feb.	295	179	311	153	232	174
Mar.	288	203	312	183	238	181
Apr.	279	219	320	203	244	182
May	256	224	313	207	251	184
June	270	231	323	212	254	189
July	260	229	287	216	256	195
Aug.	261	232	301	233	259	200
Sept.	292	254	336	259	261	206
Oct.	291	248	339	262	264	211
Nov.	307	254	351	278	265	215
Dec.	...	271	...	292	...	220
Ave.	...	227	...	222	...	194





Malleable Iron Castings

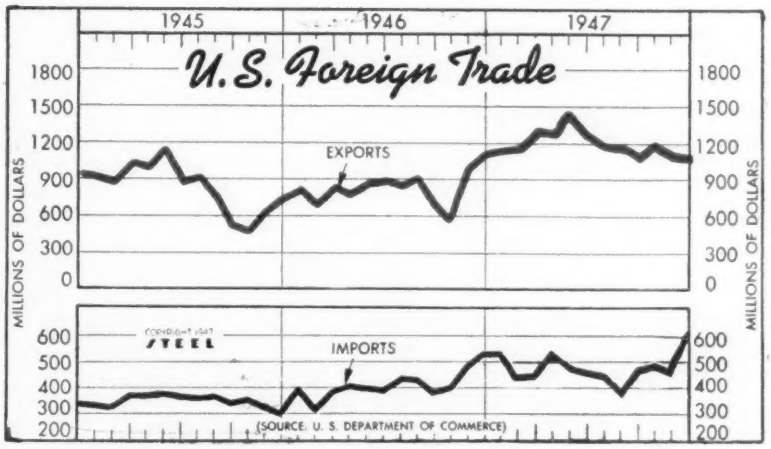
	Shipments (000 omitted)		Unfilled orders for castings for sale (000 omitted)	
	1947	1946	1947	1946
Jan.	75.9	54.0	260	246
Feb.	74.7	40.2	274	249
Mar.	76.6	50.2	281	263
Apr.	81.9	65.0	275	268
May	75.5	62.6	262	272
June	78.5	61.6	249	276
July	64.2	64.4	235	272
Aug.	62.4	67.9	230	273
Sept.	71.6	69.5	218	277
Oct.	84.0	79.2	211	281
Nov.	72.1	69.0	206	278
Dec.	77.8	68.3	202	268
Total	895.1	752.0		

Foreign Trade

Bureau of Foreign and Domestic Commerce

(Unit Value—$1,000,000)

	Exports			Imports		
	1947	1946	1945	1947	1946	1945
Jan.	1,114	798	903	530	394	334
Feb.	1,146	670	887	437	318	325
Mar.	1,327	815	1,030	444	384	365
Apr.	1,299	757	1,005	512	406	366
May	1,421	851	1,135	474	393	372
June	1,242	878	870	463	382	360
July	1,162	826	893	450	431	356
Aug.	1,151	883	737	400	422	360
Sept.	1,109	643	514	481	377	335
Oct.	1,235	536	455	492	394	344
Nov.	1,138	986	639	455	478	322
Dec.	1,131	1,097	736	600	529	297
Total	14,475	9,740	9,804	5,739	4,909	4,136



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$12,455	$14,265	$13,188	$9,826
Federal Gross Debt (billions)	$254.7	$254.8	$256.5	$259.4
Bond Volume, NYSE (millions)	$16.8	$20.8	$32.4	$16.4
Stocks Sales, NYSE (thousands)	4,813	5,126	4,617	5,317
Loans and Investments (billions)†	$64.9	$65.0	$65.1	$63.9
United States Gov't. Obligations Held (millions)†	$37,315	$37,323	$37,642	$40,539

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$78.59	$78.59	$78.18	$69.73
All Commodities†	163.8	163.7	164.5	141.7
Industrial Raw Materials†	182.3	182.3	182.9	153.1
Manufactured Products†	156.7	156.5	157.3	137.5

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

HAROLD M. SCHUDT

CHARLES N. SCHMIDT

CHRISTIAN CRONIN

Harold M. Schudt has been appointed general manager of the Gadsden, Ala., works for Allis-Chalmers Mfg. Co., Milwaukee. He has served in the engineering department, Tractor Division, since 1939.

—o—

Albert J. Fischer has been named to head the product research and development laboratory of Adamas Carbide Corp., Long Island City, N. Y.

—o—

E. H. Horstman and **Hans F. Dahlstrand** have been named, respectively, chief engineer and director of engineering, steam turbine department, Allis-Chalmers Mfg. Co., Milwaukee. **A. F. Rolf,** an assistant secretary of the company for more than 25 years, and associated with the firm's New York office for nearly 45 years, has retired.

—o—

Mack Trucks Inc., New York, announces the following elections: **A. N. Morton** and **A. C. Fetzer** have been elected vice presidents of the company. Both Mr. Morton, who is in charge of the company's manufacturing operations, and Mr. Fetzer, general sales manager, will continue to make their headquarters in New York. **F. R. Harrison** has been elected to the offices of assistant secretary and assistant treasurer of the company, and **T. Wroldsen** as an assistant secretary and **J. A. Jackson,** an assistant treasurer.

—o—

F. K. McCune has been appointed assistant to the general manager of the apparatus department of General Electric Co., Schenectady, N. Y. He joined GE in 1928. He served with International General Electric Co., and later was transferred to the West Lynn Works of General Electric, becoming assistant works engineer there in 1945. In 1946 he returned to Schenectady as a member of the apparatus design engineering staff.

—o—

Charles N. Schmidt has been appointed assistant director of advertising, United States Steel Corp. of Delaware. He has been associated with American Steel & Wire Co., U. S. Steel Corp. subsidiary in Cleveland, where he has been manager of the Advertising Division.

—o—

Edwin W. Kaler has been appointed vice president for sales of Daystrom Corp., Olean and Friendship, N. Y.

—o—

C. W. LaPierre, vice president in charge of engineering, American Machine & Foundry Co., New York, has been elected a director of both American Machine & Foundry Co. and its affiliate, International Cigar Machinery Co.

—o—

Paul E. Lundquist, formerly associated with Chicago Bridge & Iron Co., has joined the Thomas Machine Mfg. Co., Pittsburgh, as sales engineer and special field representative.

—o—

Hyde Park Foundry & Machine Co., Hyde Park, Pa., announces a reorganization in which its three principal officers, who have served the company since it was established in 1895, have resigned and new officers elected. Resigning are **Thomas W. McCausland,** president, **James Lees,** vice president, and **N. H. Slonaker,** secretary and treasurer. The newly elected officers are: **Charles T. Slonaker,** son of N. H. Slonaker, elected chairman of the board and president; **Edward M. McCausland,** son of T. W. McCausland, elected vice president; and **G. Edward Clifton,** elected secretary and treasurer. C. T. Slonaker, associated with the company for some years in engineering and sales, will also act as general manager.

—o—

Christian Cronin has been appointed advertising and sales promotion manager of Olin Industries Inc., East Alton, Ill. He was formerly with McCann-Erickson, Knox-Reeves, and Sound Masters. He will make his headquarters at the Olin offices in East Alton.

—o—

A. M. Castle & Co., Chicago, announces election of **Ralph N. Isham** as a director. Mr. Isham is also director and vice president of Streeter-Amet Co. of Chicago, manufacturer of automatic weighing and recording devices and scales.

—o—

Edward Quekels, connected with Bear Mfg. Co., Rock Island, Ill., manufacturer of dynamic balancing machines, for 20 years, and sales manager for the last 15, has been named director of a newly created product development and service department. **Walter V. Hall,** who joined the company as a market specialist a year ago, will take over sales of automotive alinement and industrial balancing equipment for the company.

—o—

M. T. Herreid, vice president of Koppers Co. Inc., Pittsburgh, resigns his position as manager of the company's St. Paul gas and coke plant to devote the majority of his time to his duties as president of Missouri-Illinois Furnaces Inc., Granite City, Ill. **A. W. Lundquist** has been appoint-

How much do you pay just to HOLD nuts?

Whatever you pay . . . it's too much!

Because it is possible to eliminate entirely this time-taking, costly assembly operation with Tinnerman SPEED NUTS.

No wrench is needed to hold a SPEED NUT in position. It starts easier . . . pulls down faster . . . and requires fewer turns to tighten into a *self-locking* position. All this can be done in half the time required to handle a conventional lock washer, threaded nut, and wrench.

Switch to SPEED NUTS now. The savings in time and assembly costs can amount to thousands of dollars! Consider, too, the savings *in material costs*—no lock washers needed—and *in production costs*—no welding, clinching or riveting.

Send in your assembly details. Our engineers will be glad to prepare a no-charge, no-obligation fastening analysis of your product. Also, write for your copy of our new descriptive bulletin.

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2038 FULTON ROAD • CLEVELAND 13, OHIO

In Canada: Dominion Fasteners Limited, Hamilton
In England: Simmonds Aerocessories, Ltd., Treforest
In France: Aerocessoires Simmonds, S. A., Paris

TINNERMAN

Out of the basic SPEED NUT principle has grown a complete System of Fastenings for metallic and non-metallic parts. This System incorporates not only standard SPEED NUT designs but also special designs constantly being developed by the Tinnerman Engineering Department.

Speed FASTEST THING IN FASTENINGS *Nuts*

Patented—Trade Mark Reg. U. S. Pat. Off.

THERE'S A SPEED NUT FOR EVERY FASTENING NEED—MORE THAN 4000 SHAPES AND SIZES

ed to succeed Mr. Herreid as plant manager. In addition to his duties with the subsidiary company, Missouri-Illinois, Mr. Herreid retains his vice presidency in Koppers' Gas and Coke Division, and will continue to advise on operation of the St. Paul plant.

—o—

St. Joseph Lead Co., New York, announces appointment of **Harry E. Outcault** as manager, zinc oxide sales. Associated with the company since 1931, he served as manager of technical service, and more recently as assistant sales manager.

—o—

Dr. W. E. Hanford has been elected to the newly created post of director of petroleum and chemical research, M. W. Kellogg Co., New York. He joined the company in 1946, having previously been associated with General Aniline & Film Corp., Binghamton, N. Y., as director of research.

—o—

Atomic Energy Commission, Washington, announces that **Dr. Robert F. Mehl,** director of Metals Research Laboratory, and head of the department of metallurgical engineering at the Carnegie Institute of Technology, has been appointed to the Committee for the Distribution of Radioisotopes.

—o—

C. A. Waite Co., Pittsburgh, announces appointment of **John O'Connor** as sales representative in western Pennsylvania, West Virginia and the eastern part of Ohio. He was formerly with Copperweld Steel Co., Warren, O.

—o—

The American Society of Body Engineers elected the following officers for the ensuing year: **Alfred H. Haberstump,** president; **Arthur L. Bradley,** vice president; **Albert W. Arndt,** secretary; **William K. Norwick,** treasurer.

—o—

John S. Coleman, president, Birmingham Trust National Bank, has been named to the board of Sloss-Sheffield Steel & Iron Co., Birmingham.

—o—

Ralph E. Flanders, engineer, industrialist, statesman and United States Senator from Vermont, is recipient of the Washington Award for 1948 "for high technical skill in perfecting the tools of industry and for distinguished service in the field of human relationships." The award, founded in 1916 by **John Watson Alvord** and administered by the Western Society of Engineers, was conferred at a dinner in Chicago, Feb. 14.

—o—

George H. Carden and **T. G. Smith** have been named, respectively, manager of the Baltimore district office and resident representative at Beaumont, Tex., for Allis-Chalmers Mfg. Co., Milwaukee.

—o—

W. W. McCutcheon, former supervisor in the quality and inspection department of Boeing Airplane Co., Seattle, Wash., Division, has been transferred to the Wichita, Kans., Division, as chief inspector. He is succeeded at Seattle by **Fred A. Yerian. Ralph B. Gilbert,** formerly assistant chief industrial engineer of the Seattle Division, has been appointed staff assistant to **John O. Yeasting,** assistant to the president of Boeing Airplane Co. Mr. Gilbert will be in charge of company analysis and operations reports.

—o—

Philip F. Thayer has joined the National Motor Bearing Co. Inc., Redwood City, Calif., as manager of manufacturing. He was formerly vice president in charge of engineering, and director of Rheem Mfg. Co.

—o—

Joseph C. Herbert has been named assistant managing director of Industria Columbiana de Llantas, Bogota, Colombia, an associated company of B. F. Goodrich Co., Akron. He had formerly been manager of the tire and tube manufacturing plant in Tuscaloosa, Ala., for the B. F. Goodrich Co.

—o—

H. H. Bullen has been appointed manager of electrical products sales for the western district of American Steel & Wire Co., Cleveland, U. S. Steel Corp. subsidiary. He will continue to maintain his headquarters in Chicago, where he has been serving as assistant manager of electrical, wire rope and construction materials sales.

—o—

E. C. Blackwood has been appointed sales representative in the Cincinnati area covering the southwestern portion of Ohio for Bedford Tool & Forge Co., Bedford, O.

—o—

Pardee H. Frank, service manager, Timken Roller Bearing Co., Canton, O., has retired after 27 years of continuous service. He is succeeded by **Elmer Anderson,** who has been assistant service manager for the past year and a half.

—o—

Ferracute Machine Co., Bridgeton, N. J., has announced the appointment of **C. Paul Denckla** as sales representative in the Philadelphia district, succeeding the late **Edward Graepp.** He will represent the entire line of the company's mechanical presses, the Super Speed press and the Ferracute press brake.

—o—

Theodore C. Froeberg has been appointed district manager of Iowa and the Tri-Cities territory by Size Control Co., division of American Gage & Machine Co., Chicago. **William C. Massow** has been appointed assistant sales manager in charge of press sales by Walsh Press & Die Co., another division of American Gage & Machine Co.

—o—

Consolidation of the industrial engineering and product engineering departments under **David A. Edwards** as engineering manager, and **Paul F. Metz,** chief engineer, has been announced by the Estate Heatrola Division of Noma Electric Corp., Hamilton, O. Mr. Edwards joined the division in 1946 as chief industrial engineer, and had previously been connected with Carnegie-Illinois Steel Corp. Mr. Metz has been in the Estate engineering department for 25 years, the last five as chief engineer.

—o—

E. C. Damrow has resigned as president and general manager of Damrow Bros. Co., Fond du Lac, Wis., and has been elected chairman of the board of that organization. He is succeeded as general manager by **Peter P. Weidenbruch,** who, for the last 10 years, has been associated with the company as consultant and adviser.

—o—

Edward B. Nitchie has been appointed manager of operations and engineering of Basic Refractories Inc., Cleveland. He was formerly associated with Cutter Laboratories, Berkeley, Calif., as works manager.

—o—

Roy T. Hurley, recently resigned as vice president in charge of manu-

EDWARD B. NITCHIE

UNITED STATES RUBBER COMPANY

SERVING THROUGH SCIENCE

With a Lift of Her Finger... She Raises Pressure by the Ton!

U. S. Royalite Grinding Wheel Sample being tested with this specially-designed machine in a U. S. Rubber Company laboratory.

Here, on a specially-designed machine, "U. S." engineers have taken a grinding wheel sample and just tested it to destruction!

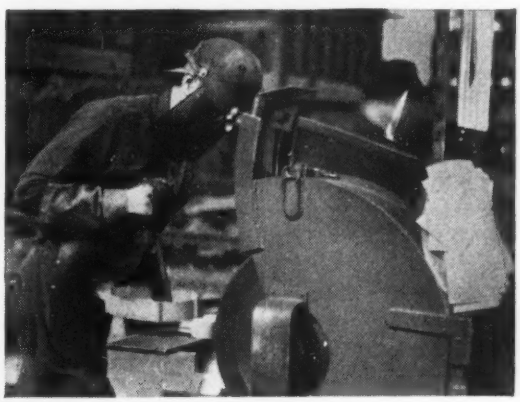
But before this grinding wheel reached the breaking point, it had proved its ability not only to meet, but to *surpass*, the strict specifications demanded by the customer's job.

Thorough testing in "U. S." research laboratories is one of the reasons why U. S. Royalite Grinding Wheels are so much in demand, testing that covers not only abrasives and bonds of every kind, but also the related fields covered by all the products of United States Rubber Company.

Then there's the test of time. Experience built up in the course of 84 years enables "U. S." to solve current wheel problems of every type—and to anticipate future problems brought on by higher production quotas and new manufacturing techniques.

As a result, whether you're snagging castings, grinding ball races or working with billets, bits, slabs or sauce pans, you'll find a U. S. Royalite Wheel carefully *engineered to your job*. In addition, "U. S." field engineers, by thorough testing right in your own plant, can give you accurate grinding wheel costs *in advance*.

For complete information, write to Mechanical Goods Division, United States Rubber Company, 1230 Avenue of the Americas, New York 20, N. Y.



When this midwestern iron foundry adopted high speed snagging 17 years ago, it picked U. S. Royalite Wheels. It has been using them ever since on the basis of their superior performance.

U. S. ROYALITE GRINDING WHEELS

ENGINEERED TO YOUR JOB

facturing, Bendix Aviation Corp., Detroit, and active with that company since 1935, has been appointed to the manufacturing staff of Ford Motor Co., Dearborn, Mich.

—o—

John S. Richards, director of foreign funds control for the Treasury Department, has been appointed director of foreign exchange for the International Division of Ford Motor Co., Dearborn, Mich., assuming his new duties April 1.

—o—

Lewis Gordon has been appointed director of the International Sales Division, Sylvania Electric Products Inc., New York. He succeeds **Walter A. Coogan,** resigned. Mr. Gordon has been assistant to the vice president in charge of sales.

—o—

John L. Hughes has been appointed advertising manager, and **Charles H. Smith,** sales training manager, of the Merchandising Division, Hotpoint Inc., subsidiary of General Electric Co.

—o—

Gerard J. Carney has been appointed sales manager, Special Products Division, Lodge & Shipley Co., Cincinnati.

—o—

Allegheny Ludlum Steel Corp., Pittsburgh, announces appointments in its production, research engineering and sales staffs as follows: **R. J. Bryan** has been named plant manager of the Buffalo foundry, **Dr. P. K. Koch** as associate director of research in charge of tool and die steel and allied products, **George I. Bottcher** as assistant chief engineer, and **C. M. Binney** as assistant district manager of the New York sales district.

—o—

James W. Arthur has been appointed North Central district representative, and **Allen A. Olson,** Pacific district representative for the wire and cable section of the appliance and merchandise department, General Electric Co. **John O. Wiley,** formerly assigned to the Minneapolis territory as representative for conduit products, has been appointed representative for the same line in Indiana and northern Illinois.

—o—

William J. Redman has been appointed division chief engineer of Wilson-Snyder Mfg. Division of Oil Well Supply Co., a U. S. Steel Corp. subsidiary at Braddock, Pa. He has been assistant chief engineer with the division since 1942.

—o—

F. H. Johnson has been appointed an assistant chief engineer of Carnegie-Illinois Steel Corp., U. S. Steel Corp. subsidiary. At the time of his present appointment Mr. Johnson was chief engineer for the Chicago district of the company.

—o—

Carl E. Miller has joined the research advisory staff of Battelle Memorial Institute, Columbus. He will act as a technical advisor on research in coal, gas, and petroleum technology.

—o—

Howard J. Elgin and **Charles H. Roper** have been elected vice presidents of Steel Sales Corp., Chicago. Mr. Elgin, who joined the company in 1935, served in various capacities until he became manager of monel and nickel sales in 1944. Mr. Roper joined Steel Sales Corp. in 1927, and in 1934 was appointed manager of the company's St. Louis branch office and warehouse.

—o—

Brown Fintube Co., Elyria, O., announces appointment of **Rolland D. Koenitzer** as assistant chief engineer of the heat transfer department. He was recently associated with the McCord Corp., Detroit, as assistant chief engineer.

—o—

Del Cleland, superintendent of the Motor Division, Studebaker Corp., South Bend, Ind., has been named manager of the company's Standards Division. He has been active with Studebaker since 1908. **Fred D. Foreman** succeeds Mr. Cleland as superintendent of machining and motor assembly.

—o—

Y. F. Hardcastle, vice president in charge of manufacturing, Pennsylvania Salt Mfg. Co., Philadelphia, has been elected to the board of directors.

—o—

Donald L. Ande has been appointed district manager of the Baltimore warehouse, United States Steel Supply Co., U. S. Steel Corp. subsidiary. He joined the company in March, 1947, as assistant district manager of the Pittsburgh warehouse, and prior to that was employed in both the sales and production departments of Carnegie-Illinois Steel Corp.

—o—

Ampco Metal Inc., Milwaukee, has announced the following changes in its sales organization: **Jack K. Bybee** has been appointed district manager, Detroit sales territory, assisted by **Don Coleman,** field engineer. In the Toledo, O., area, Industrial Instrument Co., Millbury, O., has been appointed Ampco distributor, and **Wayne Camp** and **Donald Bennet** will work with users in the application of aluminum bronze and other Ampco products. **Gordon E. Brown** has been appointed district manager, Chicago sales territory, assisted by **Robert H. Louthain,** field engineer, who succeeds **Tom Coghill,** appointed development engineer, Process Industries, with headquarters in Chicago.

ALLEN R. KELSO

Elected executive vice president and general manager, Warco Press and Warren Stamping Divisions, Federal Machine & Welder Co., Warren, O. Noted in STEEL, Feb. 9 issue, p. 66

—o—

H. A. Berg, president of Woodward Iron Co., Birmingham, since 1933, and previously vice president and general manager of Sloss-Sheffield Steel & Iron Co., also of Birmingham, has retired. He is succeeded in the presidency of Woodward Iron Co. by **Bradford C. Colcord,** formerly superintendent of the Lorain, O., plant of National Tube Co. **Hewitt Smith,** general superintendent of mines at Woodward Iron Co., has been promoted to the vice presidency.

—o—

Edwin A. Hamala, Cleveland advertising executive since 1933, has joined the staff of Jack & Heintz Precision Industries Inc., Cleveland, as advertising and sales promotion manager.

—o—

Electro Metallurgical Co., unit of Union Carbide & Carbon Corp., New York, announces the following appointments in its technical service and development department. **Russell Franks** was named chief metallurgist, with headquarters in Pittsburgh. The following were named division managers of service: **J. N. Ludwig** Jr., with headquarters in Pittsburgh; **R. J. Portman,** Chicago; **F. W. Hanson,** New York. **W. B. McFerrin** was appointed district manager of service, with headquarters in Detroit.

—o—

James E. Pollak has been appointed manager, construction materials, of Southwest Steel Rolling Mills, Los

W. HEATH TALMADGE

Has been appointed general manager, Economy Steel Co., Los Angeles. Noted in STEEL, Feb. 16 issue, p. 77

FRANK M. MASON

Appointed vice president in charge of Atlantic plant, U. S. Electrical Motors Inc. Noted in STEEL, Feb. 16 issue, p. 76

STANWOOD W. SPARROW

Named vice president in charge of engineering, Studebaker Corp., South Bend, Ind. Noted in STEEL, Feb. 16 issue, p. 76

Angeles. He formerly had been an executive of the Pollak Steel Co., Cincinnati. During the war he was in the Ordnance Dept. of the Army, serving for two years on the West Coast.

—o—

J. R. Kelly has been appointed representative in the New England states, New Jersey and eastern New York for Ohio Valley Steel Sales Co., Steubenville, O. His headquarters will be in Jersey City, N. J.

—o—

M. E. Henry has been appointed to succeed **Ralph R. Huffman,** resigned, who has been in charge of sales promotion activities for Taylor-Winfield Corp., Warren, O.

—o—

Clay Colley, formerly engineer for Link-Belt Co., Pacific Division, has joined Quinton Engineers Ltd., Los Angeles.

—o—

Dr. A. L. Corbman has been appointed director of administration and research, Corbman Bros., Philadelphia.

—o—

E. J. Kulas has resigned as a director of Jones & Laughlin Steel Corp., Pittsburgh, and is succeeded by **W. H. Dupka,** vice president and controller of the corporation, who has also been elected a member of the executive committee.

—o—

John F. Shea has been appointed sales manager for the San Pedro, Calif., yard of Bethlehem Steel Co.'s Shipbuilding Division.

—o—

Ira S. Latimer, for the past 12 years associated with Rotary Electric Steel Co., Detroit, as metallurgical engineer, sales metallurgist and district manager at Chicago, has been appointed representative for the Plymouth Steel Co., Detroit.

—o—

H. S. Robertson has been elected vice president of Harbison-Walker Refractories Co., Pittsburgh. Associated with the sales departments for 32 years, Mr. Robertson joined the company in 1916. He served in various capacities, and was named to the board of directors in 1943.

—o—

John J. Hart Jr. has been named sales manager of a recently formed division of Watson-Standard Co., Pittsburgh. He has been associated with Lake Erie Engineering Corp., Buffalo, where he served as district sales representative and later as assistant manager of that firm's Feller Engineering Division.

—o—

Charles Lukens Huston Jr. has been elected vice president, and **Robert G. Bloom,** controller, of Lukens Steel Co., Coatesville, Pa. Mr. Huston has been serving as executive assistant to the president, which position he will continue to hold. The post of controller, hitherto, was an appointive one, in which Mr. Bloom has served since 1943. At the last annual meeting of the stockholders of the company, this office was made elective.

—o—

R. J. Ritchey has been appointed director of the Market Development Division, a new unit of the sales department of United States Steel Corp. which will commence functioning March 1, 1948. Mr. Ritchie previously was market development manager of Carnegie-Illinois Steel Corp.

OBITUARIES . . .

Patrick J. Flaherty, 69, owner of the Somerville Iron Works, Somerville N. J., died at his winter home in Miami, Fla., on Feb. 12. He was chairman of the Johnson Bronze Co., New Castle, Pa.

—o—

Theodore Wachs, 62, mechanical engineer, Ballinger Co., Philadelphia, died at his home in Wayne, Pa., Feb. 8. Well known as a mechanical and industrial engineer and consultant, Mr. Wachs carried out important engineering and production projects for Armour & Co. and Sears, Roebuck & Co. as assistant to Lucien Yeomans; also for Chicago Pneumatic Tool Co., Bauroth Machine & Tool Co., Toledo Steel Barrel Co., E. H. Wachs Co., and Victor Division of the Radio Corp. of America.

—o—

Harry W. Reade, 56, for the past 15 years manager of apparatus sales, Air Reduction Sales Co., New York, died Feb. 15.

—o—

George F. White, retired secretary-treasurer, Steel & Tube Division, Republic Steel Corp., Cleveland, died Feb. 1 in Winter Park, Fla., where he had been making his home since his retirement in 1940.

—o—

Benjamin F. Bart, 60, executive administrator, southwestern section of A. O. Smith Corp. at Houston, Tex., died recently.

—o—

William Harty, 69, executive vice president of the Canadian Car & Foundry Co., Montreal, died Feb. 12.

—o—

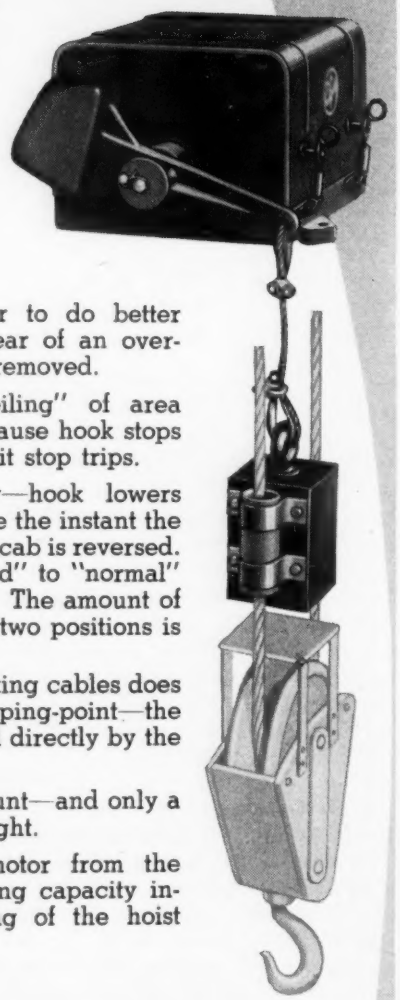
F. A. Sundquist, 59, assistant general sales manager, Massey-Harris Co., Racine, Wis., died recently.

For Better Crane Performance

EC&M YOUNGSTOWN SAFETY LIMIT STOP

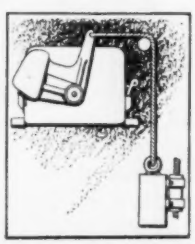
Eliminates Fear of Overtravel -- Permits High Lifts

This Safety Limit Stop offers protection for men and equipment saves time and reduces costs.



1. Enables the operator to do better work, because the fear of an over-hoisting accident is removed.
2. Raises "working - ceiling" of area served by crane, because hook stops quickly when the limit stop trips.
3. Re-sets automatically—hook lowers out of the danger zone the instant the hoist-controller in the cab is reversed. Transfer from "tripped" to "normal" connections is rapid. The amount of travel between these two positions is low.
4. Stretching of the hoisting cables does not affect the tripping-point—the Limit Stop is operated directly by the hook block.
5. Compact, easy to mount—and only a single suspended-weight.
6. Disconnects hoist - motor from the line—high interrupting capacity insures positive opening of the hoist motor current.

Youngstown Safety Limit Stops are built for both a-c and d-c hoist motors and are easily applied to either new or old cranes. As a check against human error, these limit stops have no equal. Write for your copy of Bulletin 1032.



◀ Optional Style—with offset weighted-arm which eliminates intermediate sheaves when Stop is not mounted directly over crane hook-block. Available on all sizes of EC&M Youngstown Limit Stops.

EC&M's Fiftieth Anniversary

THE ELECTRIC CONTROLLER & MFG. CO.

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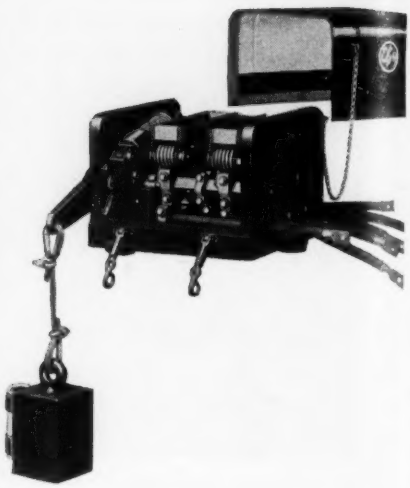
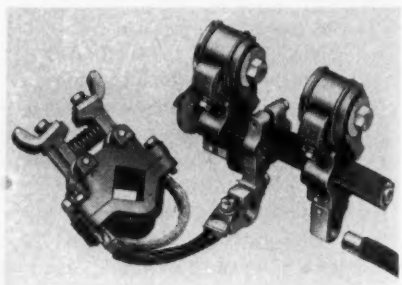


Youngstown Safety Limit Stops are supplied with long leads for making external connections. Each lead is clearly marked to identify it with the symbol on the wiring diagram. Snug-fitting, synthetic rubber grommets through which the leads emerge from the case exclude dust from the interior of the Limit Stop. Outer ends of the leads are equipped with lugs. Inner ends have brass connectors which fit into circular clamp terminals, tightened or loosened by a single bolt. Note that these are straight leads so that they can be removed or inserted easily. Maintenance men appreciate these features.



Shafts supporting live parts in Youngstown Limit Stops are mica-insulated. Contact pressure is obtained by a single spring out of the range of the arc (note left view above). At the right is the stationary shaft which carries the stationary contacts, blow-out coils and arcing guards. This shaft is readily removable as a unit. Connectors between moving and stationary contacts are heavy, flexible stranded copper cables with cambric insulators. Contact surfaces are almost vertical and their wide opening (1¼") assures safe interruption of the hoist motor current under any hoisting condition.

Advertisement

Engineering News . . . AT A GLANCE

STEEL "WALLPAPER"—In Baltimore, Baltimore Porcelain Steel Co., reports it is now furnishing porcelain enamel "wallpaper" in rolls that can be cut to desired lengths with tin snips. Covering is made by coating 32-gage steel with a thin, firmly bonded porcelain enamel, and is applied to walls with a special cement.

TIP PICK-UP—One of the faults encountered when spot welding aluminum is tip pick-up is caused by alloying of aluminum with copper from the electrode. One way to overcome this problem, according to Reynolds Metals, is to use a refrigerated tip to keep temperature of the copper electrode face contacting the aluminum as low as possible. With a refrigerated electrode it is possible to increase greatly number of spot welds between tip cleanings, and welds are very satisfactory. Many users of such tips standardize on a coolant temperature between 0 and 10° F, although a temperature of 15 to 20° F may also produce good work.

JUMPS ENGINE EFFICIENCY—Cam principle of power drive patented recently by Vincent Palumbo, president, Pal-Vin Machine & Mfg. Co., Cleveland, is said to actually increase the efficiency of an internal combustion engine by one third through less frictional loss. According to the inventor, overall size of any engine can be reduced considerably by this method of power drive, more power being achieved because each stroke is more uniform with an equal expenditure of power on the full stroke.

RHYTHMICAL HARMONICS—Manual efforts of 20 men using sledges and poke bars are being duplicated by an electric-powered vibrating unit that empties frozen coal cars at the plant of Inland Steel Co., East Chicago, Ill. By setting up "rhythmical harmonics"—over 1000 impulses per minute, the unit completes the coal-loosening operation in about 2 to 5 minutes as against 15 minutes to an hour by manual labor. Developed by Hewitt-Robins Inc., Chicago, the shakeout also helps accelerate turnover of badly needed railroad cars.

PETROLEUM FUEL FOR STEEL—Petroleum is to be used for fuel instead of conventional coal and coke at a new steel mill scheduled to be erected near the Assuan Dam in Egypt, it is learned. To make this possible, a new reduction process is reported to have been developed by H. A. Brassert. At present, a pilot plant is operating at Minneapolis, and Egyptian ores are being shipped there for testing. Rich iron-ore deposits exist near Assuan, and an ample supply of petroleum is available from the Near East. The mill is expected to have an initial daily capacity of 600 tons.

ROLLER PEENING—Wartime production methods for torsion bar suspensions were of high caliber and incorporated several novel features, according to a British report on German spring-making industry now in the hands of the Office of Technical Services, Washington. Among techniques noted are the use of roller peening to induce surface compressional stresses and oscillating centerless grinding of the torsional length of the bar after heat treating. The German firms also employed a 100 per cent test in which bars were twisted in torsion, both ways, to a predetermined stress within the elastic range, requirement being that bars should return to within 1 per cent of the original position at completion of the test.

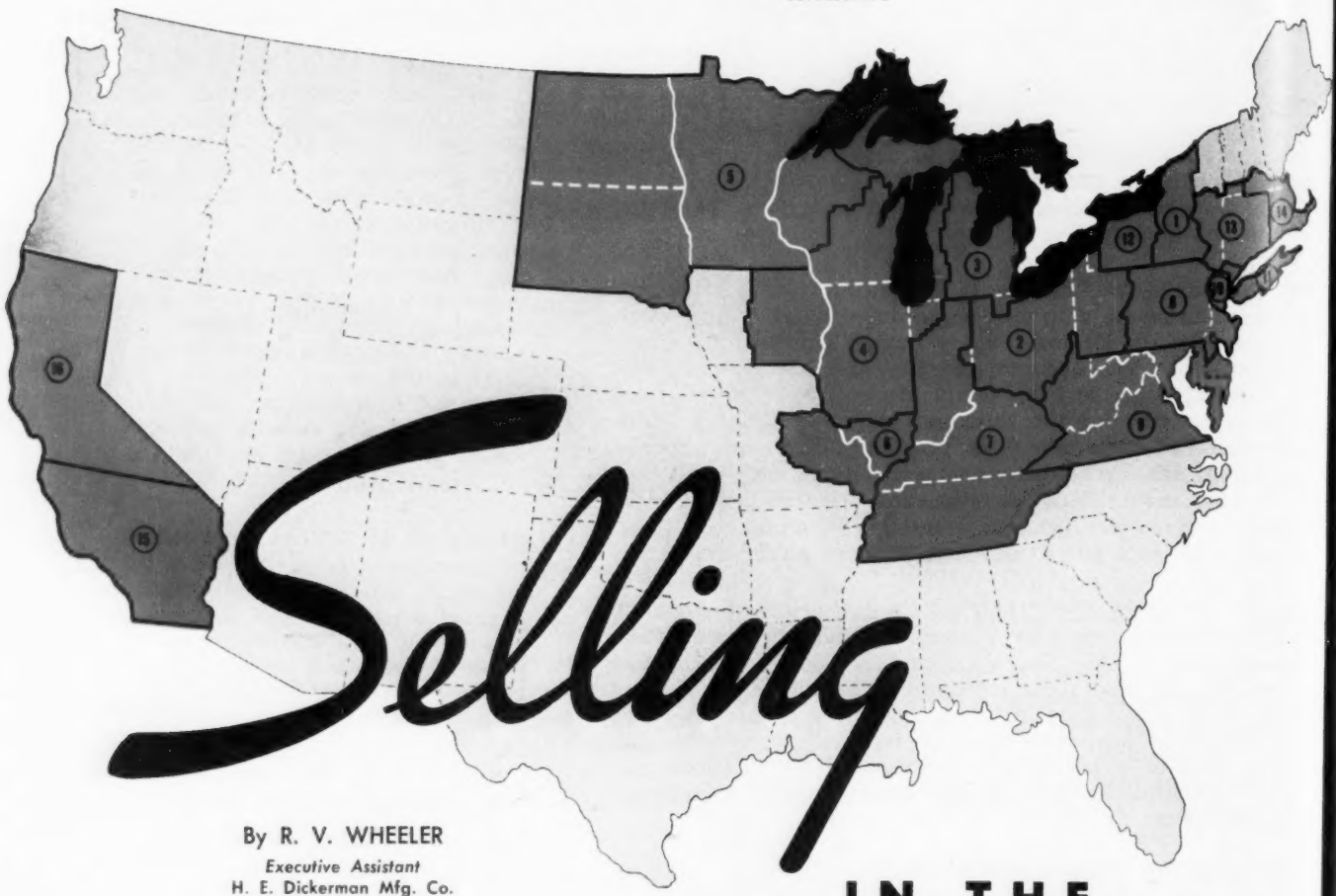
CLEANS AND RECOVERS—In the usual application of the electrostatic oil and dust precipitator on machine tools, plates of the unit must be cleaned of accumulated particles. Use of an individual unit for each machine, where it is enclosed in a cabinet with self-contained fan and motor and a baffle plate for uniform distribution of incoming oil-laden air, not only enables oil to drain off, but it allows the latter to carry with it slight dirt accumulations as they form. Setup also recovers a large volume of oil—as much as 5 gallons per machine daily. (p.86)

HUMIDITY IN METAL POWDERS—Atmospheric humidity, according to Bureau of Standards' investigations, produces a marked effect on results obtained by sieve analyses of metal powders. Differences of as much as 10 per cent between weight of fractions of powdered iron sieved under high and low humidities are observed. Furthermore, in sieve testing sponge iron, electrolytic iron, electrolytic copper and nickel, it is found that reproducible results can be obtained only when certain variables are controlled. Contributing factor, besides atmospheric humidity, is a cumulative error that results from repeated riffle cutting limited powder supplies. (p.89)

SPOT TESTING—If quick spot tests are to mean anything, according to H. Kirtchik of General Electric Co., it must be definitely known that only two or more alloys that can be mixed are present at the area in question. In many cases where use of improper material parts would be dangerous or otherwise, both the raw and finished stock are spot tested, but not necessarily with the same spot test. (p.91)

ADDS TO COST—Slides in modern die casting, besides adding to die costs, require actuation and locking. As their use involves a secondary parting, extra flash removal costs may be incurred. Another factor to be considered is that such dies may be slower in operation. This means die maintenance costs are increased. Slides, it is pointed out, require good mechanical fits and, as some clearance is required, those dimensions influenced by slides cannot be held within as close limits as with solid integral portions of the die. (p. 92)

Fig. 1—Establishment of the sales territories below was relatively simple. Most of the distributors selected were members of the American Machine Tool Distributors Association and had non-conflicting territories



Selling IN THE POSTWAR MARKET

By R. V. WHEELER
Executive Assistant
H. E. Dickerman Mfg. Co.
Springfield, Mass.

MANUFACTURERS realize now, more than ever before, that their success depends solely upon such important factors as a quality product, an experienced sales organization, imaginative engineering, well planned advertising, skillful promotion and scientific market research analysis.

Up to the early part of this year, sales of the automatic punch press feeds made by the H. E. Dickerman Mfg. Co., Springfield, Mass., were in the hands of two distributors, one of which had its own sales force and the other which sold through agents in the United States, Canada and foreign countries. For many years our products were successfully handled in this manner. However, the sales trend in the past two years began to level in spite of postwar industrial activity. We watched sales very closely the first six months of this two-year period and at the same time made a thorough study of industrial conditions throughout the country, with the net result that our executive staff urged corrective action. Sales performance was not in keeping with general industrial trend of activity.

About 18 months ago we set out to scientifically analyze our products and their markets. We asked ourselves these questions:

1—Was anything wrong with quality of our products?

2—Were improvements necessary?

3—Were customers obtaining the necessary engineering assistance?

4—What was the attitude of users?

5—Were distributors' sales and marketing methods up to date?

6—Were territories of distributors adequately covered?

7—Was the field becoming more competitive?

In answer to the quality and improvement questions, we had our engineering department make a series of exhaustive tests of our press feeds, designed to bring to light any shortcomings. The results of these tests were gratifying, since only one major improvement was necessary.

Next, we had to determine if users were getting adequate engineering assistance and instructions regarding the proper use of our equipment, and at the same time to classify user attitude. A nation-wide field survey made by our sales department revealed that some users lacked full knowledge about all that our products could do. However, users were more than satisfied with the cost reduction and increased

Manufacturer of punch press feeds finds that today's competition requires re-examination of engineering and production methods, exhaustive market research and skillful promotion, as well as an excellent product

production derived from the use of our feeds and would consider no other type for jobs within the range of sizes manufactured. This meant that we had both "user acceptance" and "user preference."

The problem now was to determine if the sales and marketing methods of our distributors were satisfactory; and whether territories were adequately covered. A thorough investigation revealed that our distributor sales methods were generally satisfactory but we were lacking in our own promotional methods. As a result, we decided to control sales at a point closer to the user, thusly permitting direct contact with the all important middleman, providing in turn a more direct route for conveying engineering information and assistance to the user.

It was now time to carefully choose our objectives for sales and marketing. These are: Primary Objective: To establish control over our sales; Secondary Objective: To strengthen the salesmaking possibilities for our products.

To obtain these objectives the following sales and marketing plan was developed:

A—Establishment of a sales engineering department

B—Locating the markets

C—Determining the market indicator

D—Choosing the distributor—domestic sales

E—Choosing the distributor—foreign sales

F—Establishing territories and quotas based upon past sales performance and the market indicator (Fig. 2).

G—Tieing the advertising campaign with the market research

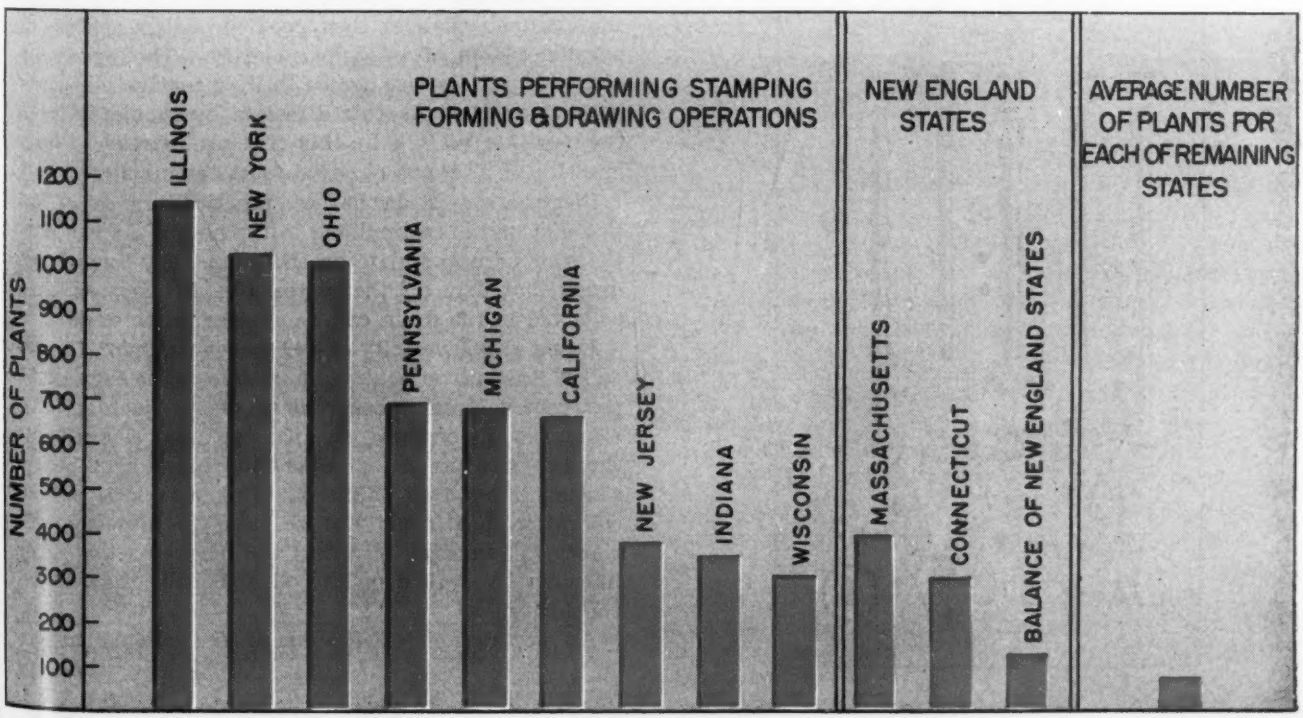
A—Establishment of Sales Engineering Department—In making a scientific analysis of markets, the first step was to lay the foundation for a good sales engineering department. We needed a department manager with considerable experience in the punch press and feeding field; one who was willing to spend the time required to know our products in every detail and to supervise investigations of sales and marketing methods. Also required was a knowledge of up-to-date promotional and advertising methods and the ability to teach distributor salesmen the "know-how" of our products, which meant unlimited traveling.

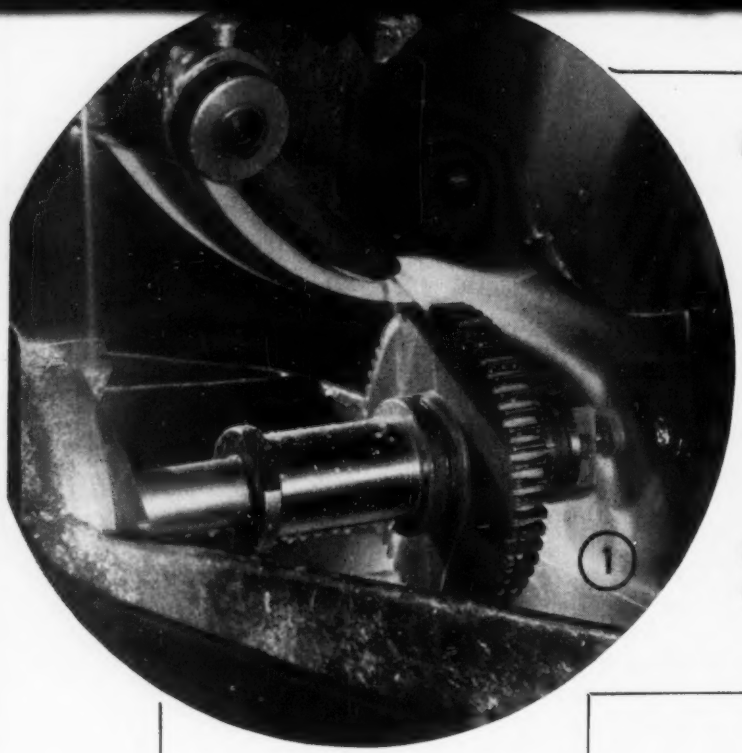
A plan was set up whereby our sales manager and his assistants beginning this year schedule their road trips with previously made arrangements to give sales talks to the distributor groups and to spend time with their salesmen in contacting customers with problems as well as prospective users.

B—Locating The Markets—We knew research on location of markets would be extremely difficult in view of the fact there had been no government census since 1939 and many changes in industry had taken place.

Our first step was to determine just where the greatest percentage of industrial work on fabricated metal products was taking place. In "Facts for Industry", published by the Industry Division, Bureau of Census, we found that 11 states accounted for the greater portion of pro- (*Please turn to Page* 119)

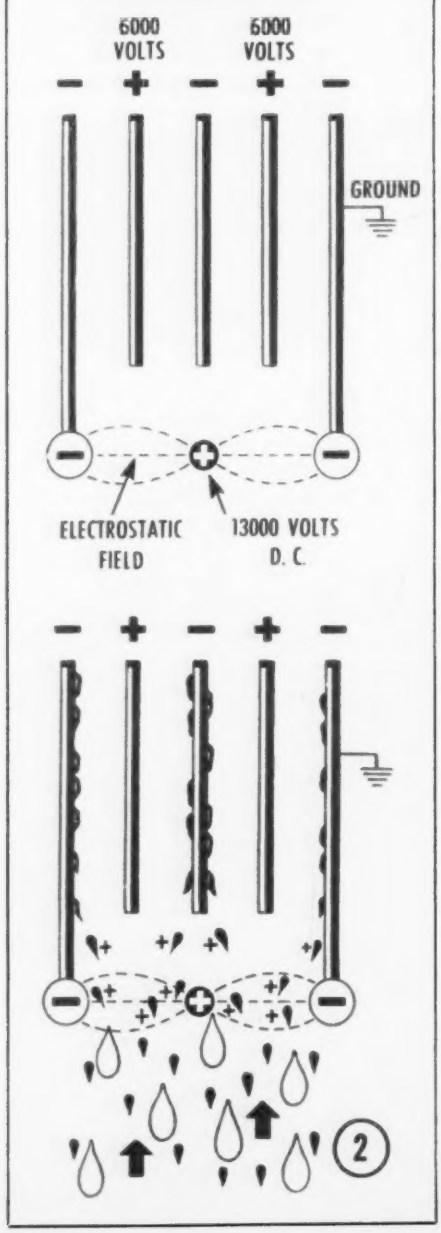
Fig. 2—Dickerman worked out a market indicator based upon STEEL'S *continuing census of metalworking. Eleven states account for the greater portion of metal product fabrication. Of these* 11, *six account for* 65 *per cent. Key states are Illinois, New York and Ohio*





PRECIPITATING Oil Coolant Mist ELECTROSTATICALLY

By removing at its source mist generated by high speed machining operations, working conditions are improved and a fire hazard eliminated



PRESENCE of oil coolant mists generated by high speed cutting, grinding or other machining operations, Fig. 1, can create serious health and safety problems if not checked. Surfaces of machines, overhead structures and floors become slippery from this settling out and thermal precipitation of oil from the atmosphere.

Heavy oil mists have a serious deteriorating effect on factory lighting systems because oil accumulates as a film on reflectors and lamps, serving as an adhesive which collects dirt from the air very rapidly. Tests show that under these conditions illumination may drop 25 to 35 per cent in a short time.

Principle of electrostatic oil and dust precipitation employed by a unit built by Westinghouse Electric Corp., Pittsburgh, consists of passing air to be cleaned between high-voltage wires and grounded rods. Enroute, each foreign particle of dust or oil is given a positive electrical charge. Air containing the charged particles then goes through a system of parallel plates of opposite polarity. The positively charged particles are drawn to the negative plate, being helped along in this direction by repulsion from the positive plate. In this manner, particles, irrespective of size, are removed from the air stream.

Cleaned air is discharged practically free of oil and dirt and is recirculated in the plant. As the particles of oil accumulate on the plate, they form large drops that drip off the plates, Fig. 2. The oil thus collected in the drain can be used again as coolant.

Using an air velocity of 300 feet per minute, the so-called Precipitron achieves a cleaning efficiency of 90 per cent. Usual measurement of air-cleaning efficiency is determined by passing the cleaned air through a white filter paper, the black spot representing unremoved particles. This blackness or discoloration test could not be used to measure efficiency in removing oil mists and smoke as the paper immediately soaked up the oil and made the test inconclusive.

An accurate determination of the efficacy of oil-

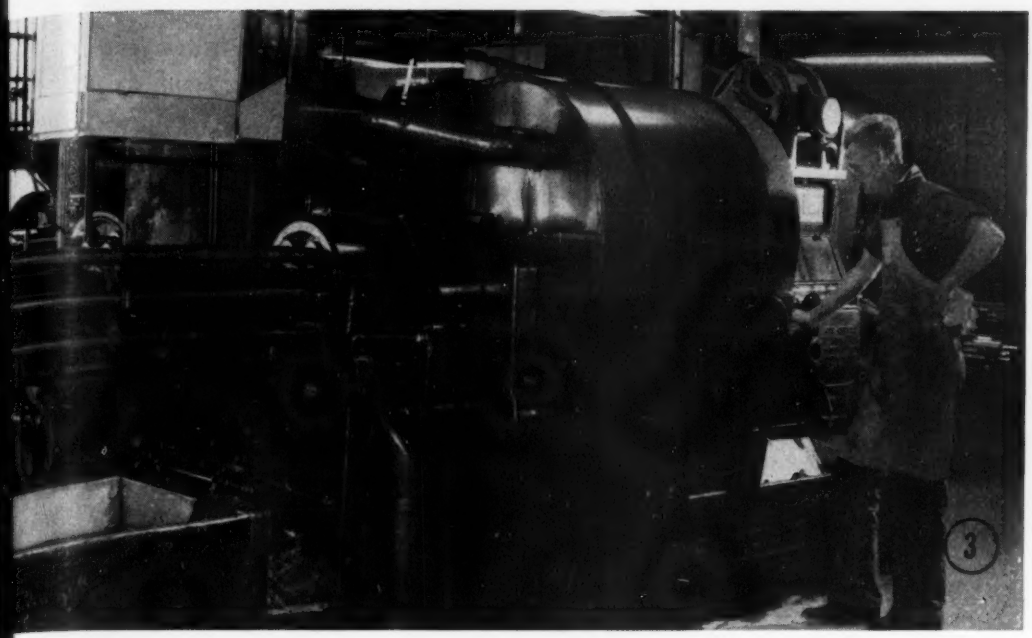


Fig. 1—Oil coolant mists generated by machining operations can create serious health and safety problems

Fig. 2—Electrostatic oil mist control unit consists of three major parts: Collector cell, represented by the five vertical lines; ionizer, represented by two negatively and one positively identified circles; and power pack

Fig. 3—Hood for automatic screw machine makes possible oil mist removal by precipitation. Precipitron cell is in top left foreground; power pack is at screw machine

removal methods was secured by passing the cleaned air through a light beam contained in a chamber having a nonreflecting black lining. A photograph across a beam of light in otherwise dark surroundings and in absolutely clean air shows nothing as there is no reflection or refraction from foreign particles. The more particles present in the air, the more the light beam is diffused, and the more distinct the beam of light shows in the photograph. By means of densitometer (a device for measuring the comparative densities of translucent materials by means of a light beam and photo-electric tube) the comparative strength of the light beam on a photographic negative can be determined and the efficiency of the cleaning device appraised.

Application of the electrostatic precipitration unit to machine-tool installations takes four general forms. In the first, ducts from intakes on several individual machines enter a larger duct handling this group. Air from the machines is drawn into the common duct by a large unit comprised of a fan and Precipitron. This, however, necessitated using larger units, the erection of considerable duct work, limitation of machine placement flexibility, and presented possible interference with material handling.

A variation of this plan uses a common fan and exhaust duct for several machines, but each machine is supplied with a separate precipitator, which is energized from a common power pack. With this arrangement the unit is smaller, the electronic power tubes supplying the Precipitrons used to best advantage, and the location of machines made more flexible. The flexibility of machine-tool placement is, however, still somewhat hampered, and the overhead duct work is bulky.

Another application places the air cleaner in individual cabinets, which also house the fan. Each cabinet is fitted to its own machine. Befogged air is drawn from the machine pick-up into an intake connected to the bottom of the cabinet, through the electrostatic cleaner, and discharged into the room for recirculation. This is a completely mobile arrangement except for the power pack, which is common to several machines. The high voltages are transmitted to each of the precipitators by separate cable in grounded conduit.

A completely individual unit for each machine tool is the most flexible arrangement. This is a cabinet with self-contained fan and motor, a baffle plate for uniform distribution of the incoming oil-laden air, a mechanical filter to remove the large particles, both solid and liquid, plus the precipitating element. This basic electrostatic unit is rated at about 600 cubic feet per minute. The integral power pack supplies direct-current ionizing voltage of 13,000, and a collecting-plate voltage of 6000 direct current.

In the usual application, collecting dry dust and dirt, the plates must be cleansed of their accumulated particles. But in this application, the oil drains off and carries with it the slight dirt accumulations as they form. The large volume of oil recovered—as much as 5 gallons per machine daily—also passes through and cleans the mechanical filter in a similar manner.

Obviously, the most efficient application of the unit to a machine tool is achieved when the unit is incorporated into the original design of the machine. The intake then becomes an integral portion of the machine with corresponding increases in efficiency of oil-mist pick-up and presents a minimum of interference with the performance of the machine.

The present pressing need, however, is to eliminate the great concentrations of oil mist from the atmospheres of plants now in existence. For installation with existing machines a convenient metal pick-up is fabricated to fit the mechanical and ventilating needs peculiar to the machine and the work involved. This is connected by a duct to the opening at the bottom of the cleaner.

Experience has shown that each application of the unit to existing equipment must be handled as an individual plant problem. (*Please turn to Page* 115)

Seen and Heard in the Machinery Field

By GUY HUBBARD
Machine Tool Editor

TRANSPARENT MACHINE TOOL: For some time it has been rather common and very successful practice to make transparent plastic replicas of machine parts for the purpose of visual study of effects of stresses—this through use of polarized light. Most of us now are familiar with the "distorted rainbow" effects which appear, and which indicate dangerous "stress raisers", when those plastic models are subjected to the equivalent of operating stresses.

One of the most interesting demonstrations of that kind which I have observed recently, is that embodied in a moving picture on the theory and practice of gearing and gear cutting, produced by Fellows Gear Shaper Co., Springfield, Vermont. In this picture transparent plastic gears, actually photographed running together under polarized light, show the fluctuating patterns of color as the gear teeth mesh.

I have just had a preview of use of transparent plastics as constructional material in the building of a full size, operating machine tool. In this case the entire base, head and work table of the machine are constructed of clear plastics plates, cut and "welded" just as a sheet steel frame would be cut and welded.

This plastics construction allows all the interesting "innards" of this machine to be observed in full operation. Incidentally, it gives one a real conception of how closely packed the interior of a modern machine tool is with all manner of apparatus.

At this stage of the game, I won't "give away" the name of the builder of this transparent machine tool. All that I will say is that it will be on exhibition at the Tool Engineers' Industrial Exposition, sponsored by ASTE, Public Auditorium, Cleveland, March 15-19, 1948. We will be seeing you there.

TAX LAWS HINDER PROGRESS: On February 13, Clay P. Bedford, vice president in charge of manufacturing, Kaiser-Frazer Corp., Willow Run, Mich., came to Cleveland and gave those of us who are members of ASTE an insight into engineering developments now going on behind the scenes in an effort to cope with material shortages, to conserve scarce materials, and to reduce manufacturing costs.

Some of Mr. Bedford's remarks, particularly as regards extensive experiments and practical tests in use of aluminum, were rather off-the-record. I will say, however, that they have gone much further than generally is realized. What I do want to bring out are some of Mr. Bedford's conclusions—as a manufacturing executive in a highly competitive field—on the strangling effect of existing tax laws on the implementing of American ingenuity with new and improved manufacturing equipment.

"You men", said Mr. Bedford to the tool engineers, "are the ones who should be called upon right now to design and build the machines and tools needed to make our developments useful to industry. What then are the practical considerations involved in any such contemplated changeover to new and better ways of accomplishing mass production operations?

"First, there is the initial cost of the new manufacturing equipment. Second, there usually must be considered the loss to be taken on the machine tools and other items which are to be replaced.

"Unfortunately it is this second factor which all too often determines whether the new methods—regardless of their efficiency—can be adopted at all. The reason is that the machinery to be replaced must be carried on our records at many times its real value in terms of production efficiency and actual obsolescence. It must be carried at this inflated value because of existing, short-sighted depreciation and amortization requirements of our tax laws.

"At best, the effects of these traditional depreciation rules are a serious hindrance to replacement of worn out manufacturing facilities. Then when you add new technological developments which demand complete new tooling for handling new types of material, the effect obviously is doubly restrictive. This is true particularly in highly competitive businesses wherein production costs are all-important.

"The answer of course is a change in depreciation and amortization regulations which will allow industry to write off on a short term basis, those investments which are required to expand facilities in order to create new and more efficient productive power.

"Such action will end for all time those stories that certain industries are 'spitefully' holding back new developments in materials and end products. It will enable business to eliminate certain world-wide shortages due to 'under par' productive facilities. Last but by no means least, it will enable industry to deliver products cheaper and in greater quantities."

INDUSTRIAL FAMILY TREE: The recent death of Jack Carlton, affable president of the Carlton Machine Tool Co., brings vividly to my mind the help which Mr. Carlton gave me about 18 years ago in working out the "family tree" of the Cincinnati machine tool industry. Here is a glimpse of the tangled roots and branches as of that time.

"Lodge, Davis & Co. handled one of the broadest lines of machine tools of any concern in the United States—including in its line machines of practically every standard type. This company was influential in starting many other younger companies in and around Cincinnati by financing them and by giving them contracts. For example, Dietz, Gang & Co., of which William Gang had been a Lodge & Davis foreman, eventually split into Dietz, Schumacker & Boye (now Boye & Emmes Machine Tool Co.) and William E. Gang & Co., which eventually became the Carlton Machine Tool Co., headed by Jack Carlton, a former Lodge & Shipley man."

Differences of as much as 10 per cent between weight of fractions of powdered iron sieved under high and low humidities observed by Bureau of Standard investigators

Sieve Analyses of *Powdered Metals*

Affected by Atmospheric Humidity

ATMOSPHERIC humidity has a marked effect on the results obtained by sieve analyses of metal powders; controlled atmospheric conditions during such sieve testing may be necessary, therefore, when close control of particle size is desired. These facts were revealed recently by investigations of the Bureau of Standards, Washington.

Advances in the science of powder metallurgy—the art of making objects by pressing and heating metal powders—have long been hindered by the difficulty of obtaining reproducible results in large scale manufacture. This is due principally to present methods and techniques which introduce numerous variables, as yet not completely understood or controllable. In conjunction with the current program of standardization of test methods and techniques in this field, the bureau undertook an extensive investigation of the conditions contributing to the lack of reproducibility in sieve analyses of metal powders. Such analyses of particle size distribution are of major importance in powder metallurgy.

Increase in humidity tends to increase the weight of the fractions retained on the sieves and to decrease the weight of the pan fraction. Differences of as much as 10 per cent between weight of fractions of powdered iron sieved under high and low humidities were observed.

In sieve tests of sponge iron, electrolytic iron,

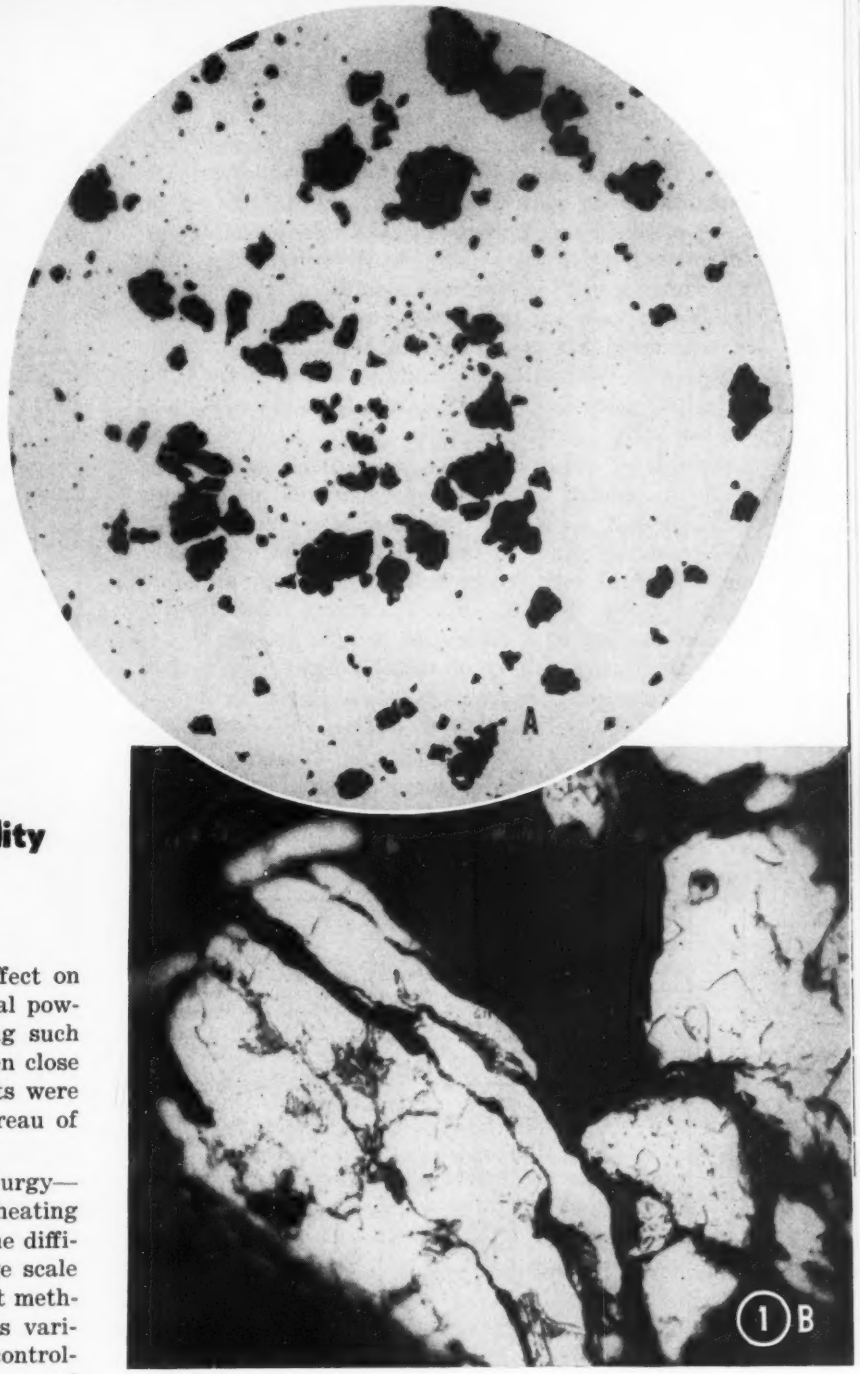


Fig. 1—A—Sponge iron powder made from reduced mill scale consists of irregular platelike particles. X50. B—This micrograph reveals some of the larger particles to be made up of several such plates cemented together with oxide of the metal. Areas of pearlite are visible in sections of the powder

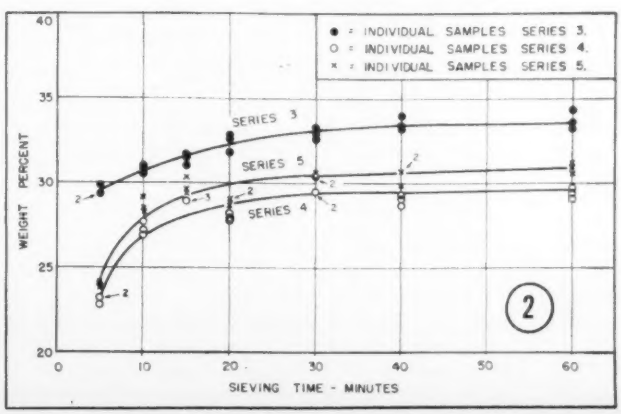


Fig. 2—Graph of three series of sponge iron sieve tests made with 100-gram samples from same sample supply after the following treatments of the powder: Series 3, dried; series 4, humidified; series 5, samples of series 4 dried and resieved

electrolytic copper and nickel, made for the purpose of accumulating supplies of sieved fractions of these powders for other studies, it was found that reproducible results could be obtained only when certain variables were controlled. Significant differences in sieve analysis often were obtained when samples of the sieve powder were sieved at different times with the same sieves. Furthermore, different sets of certified sieves used for the same powder gave variations of considerable magnitude. A contributing factor, in addition to atmospheric humidity, was a cumulative sampling error that resulted from repeated riffle cutting of limited powder supplies.

Effects of these variables were demonstrated by tests on sponge iron. This powder was made from reduced mill scale and consisted of irregular plate-like particles. Many of the larger particles were made up of several such plates held together by the oxide of the metal, Fig. 1. The sampling procedure included the use of a riffle-type sample splitter to reduce the entire supply of metal powder (50 to 100 pounds) to "sample supplies" which could be stored in one to five 1-pint Mason jars (3 to 15 pounds).

Bureau tests of the effect of high humidity on the sieving characteristics of sponge iron illustrated the difficulty of reproducible analyses of metal powders,

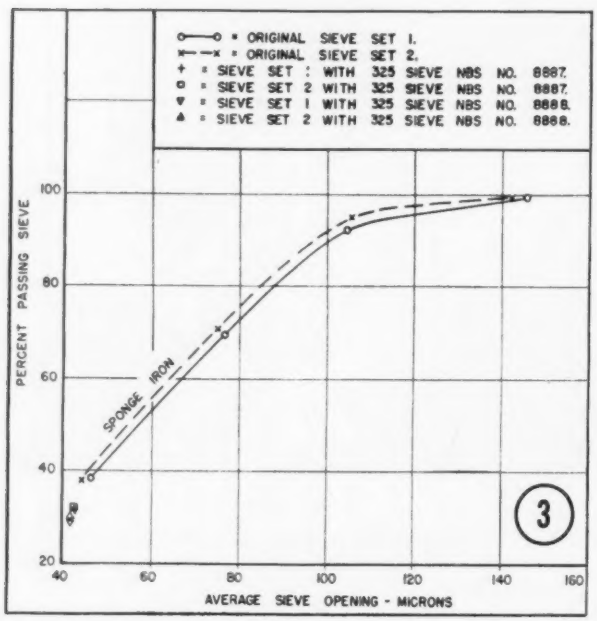

o—o = ORIGINAL SIEVE SET 1.
x—x = ORIGINAL SIEVE SET 2.
+ = SIEVE SET 1 WITH 325 SIEVE NBS NO. 8887.
o = SIEVE SET 2 WITH 325 SIEVE NBS NO. 8887.
▼ = SIEVE SET 1 WITH 325 SIEVE NBS NO. 8888.
▲ = SIEVE SET 2 WITH 325 SIEVE NBS NO. 8888.
PERCENT PASSING SIEVE
SPONGE IRON
AVERAGE SIEVE OPENING - MICRONS
3

Fig. 2. The set of certified U. S. standard sieves used in these tests, sieve set 3, included No. 100, 140, 200, 230, and 325. One hundred gram samples taken from the same freshly riffle cut sample supply were sieved for periods of 5, 10, 15, 20, 30, 40, and 60 minutes after the following treatments of the powder:

Series III.—For each time period three samples were oven dried for 1 hour at 110° C prior to sieving.
Series IV—For each time period three samples were exposed for 64 to 72 hours to a humid atmosphere in a closed vessel (desiccator) over water, with wicks dipped into the water to increase the evaporating surface.
Series V—After sieving, the humidified samples of Series IV were mixed, dried for 5 hours at 110° C, and resieved.

For the humidified samples, Series IV, the amounts of material retained on each sieve were consistently lower than those of the dried material, Series III. For example, differences in the case of the pan fractions ranged from 3.5 to 6.5 per cent of the original weight of the sample. Part of this difference (approximately 25 per cent) was recovered when the humidified samples were dried and resieved, as shown by the values obtained for Series V, Fig. 2. Values for the individual samples of Series III lay close to the curve of the plotted results while the values for Series IV and V were more scattered. Similar but smaller differences were obtained for the other sieve fractions.

Two additional series of tests were made using the same sieves and the same procedure as in Series III, but with samples taken from different sample supplies. (Results for the pan fractions are shown in Fig. 4 in comparison with those of Series III.) The differences between each succeeding series, in the order in which they were riffle-cut, amount to about 1 per cent of the original weight of the sample, Fig. 4. It is believed that these differences were due chiefly to the loss of fines as dust during riffle cutting.

Variations of considerable magnitude also were noted when powders were sieved with different sets of certified sieves. The tests were made under approximately the same sieving conditions and all samples were taken from the same sample supply.

Fractions retained by the sieves which were not replaced (all sieves larger than No. 325) agreed closely. The new No. 325 sieves retained 7.0 and 9.8 per cent more material respectively with sieve set 1; and with sieve set 2, 5.6 and 7.8 per cent. The amounts retained by the two new sieves differed by 2.8 per cent when used with sieve set 1 and 2.2 per cent with sieve set 2. (*Please turn to Page* 116)

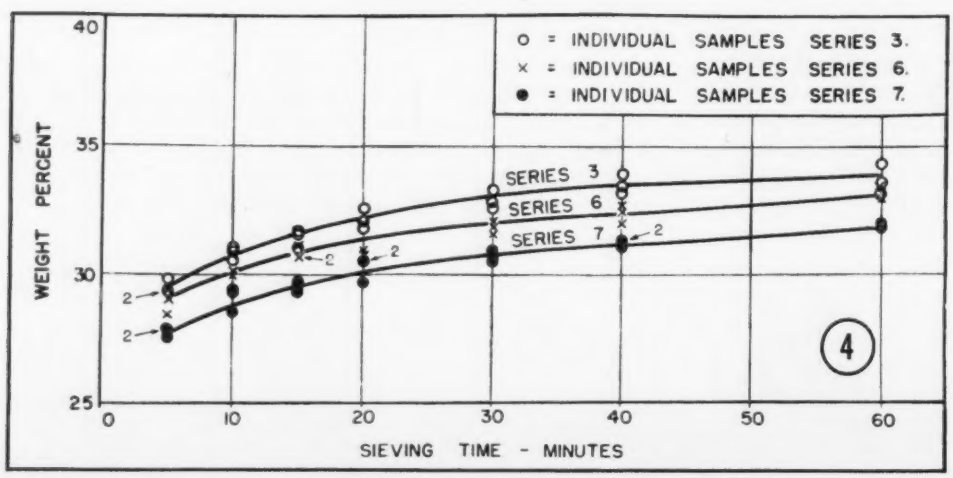


Fig. 3—Cumulative weight distribution curves for sponge iron using the actual size of average opening of the different certified sieves, instead of the normal opening, as the basis of comparison. One hundred gram samples sieved 30 minutes

Fig. 4—Graph of three series of sieve tests of 100-gram samples taken from three different sample supplies riffle-cut from the same lot of sponge iron powder in the order series 3, 6, 7

Use of nonspecific reagents found to be quick method of determining presence of certain elements in both ferrous and nonferrous alloys

HOW TO Separate Alloys BY SPOT TESTING

By H. KIRTCHIK
Thomson Laboratory
General Electric Co.
Lynn, Mass.

MUCH has been written on the identification and estimation of the amounts of certain elements in both ferrous and nonferrous alloys, but little has been said of the more valuable use of spot tests, not based on specific element determination.

Spot test, as classified by Feigl, determine the presence of elements. More important, at times, is the separation of two or more alloys by nonspecific reagents and with quick means that allow factory personnel to identify materials without elaborate transferring to spot plates, etc.

Consider, for example, two alloys, A and B, that are used in the same area of production line and subject to mixture by the usual means. Both A and B may be identical in composition except that 2 per cent of the base metal iron has been replaced by tungsten. To use a spot test for tungsten would involve a considerable amount of time for testing each bar of stock.

On the other hand, if there is a certainty that *only* A and B are present at the point in question, it would be much easier to add one drop of nitric acid HNO_3, which gives a green spot with A and a black spot with B. This is the underlying principle with which spot tests have found a tremendous use at this source with the saving of considerable money and time. No attempt is made to hypothesize that the HNO_3, is specific for tungsten, but the statement can be definitely made that if A and B arrive at the plant with company specifications as to physical and chemical properties, the B (containing the tungsten) will always give a different colored spot than A.

Advantage of this system can be noted by example later, but first, some of the disadvantages of using regular spot tests exclusively should be considered.

(A) Drop Size—Use of burets or elaborate dropping means. Out of place in a shop where hundreds of bars or units must be spot tested. Eye-droppers or dropping bottles are best used. In the determination of how much of an element is present in a material, rigid drop requirements are necessary but are not easily obtained. This variation negates, in many instances, even a semiaccurate estimate of percentage composition of an element.

(B) Skin Effect—When stainless or more complex alloys are under consideration, slight deviations in heat treatment of successive batches or heats give different outer layers on the alloy. On finished parts, variations in machining or polishing give surfaces that do not yield uniform results, even when the best technique of specific spot testing is used. As a consequence, estimation on a quantitative basis can be erroneous.

(C) Heat Treatment—If all the precautions of polishing etc., are taken, and alloys C and D are identical in composition but subject to different heat treatments, spot tests on an estimation basis often give two different values.

(D) Blotting Medium—Depending on the structure of fibers, transferred drops can react differently to the subsequent reagents added.

(E) Sensitivity—When a specific spot test is too sensitive there can be erroneous conclusions. For instance, alloys E and F are identical in composition except that E contains 5 per cent tungsten and F 5 per cent molybdenum instead. It has been found that to separate the two alloys on the basis of the presence of molybdenum in one can lead to serious conclusions, because invariably there is a small impurity of molybdenum in the tungsten bearing alloy, sufficient to give a reading which the operator can interpretate as F!

Of course, no attempt is made to underrate the value of specific spot tests, because they have their occasional uses, as will be shown, but estimation of percentage is ruled out.

In the examples given below, some of the earliest work was done by trying, at random, various mixtures of acids. As knowledge of the subject became greater, it was possible to predict what class or combination of reagents would separate two or more materials. One thing is of great importance if such quick spot tests are to mean anything, i.e. it must be definitely known that only the two or more alloys that can be mixed are present at the area in question. In many cases where the use of improper material parts would be dangerous or otherwise, the spot testing is done both on the raw and fin- (*Please turn to Page* 106)

Fig. 11—Battery of H-P-M cold chamber machines installed in plant of a custom die caster—Mid-Western Die Casting Co., Chicago. Each machine is served by an Ajax electric induction type holding furnace

MODERN Die Casting

By R. J. REEL
Die Casting Engineer
Hydraulic Press Mfg. Co.
Mt. Gilead, O.

Continuing his discussion of the many variable factors involved in die design, the author analyzes the problems of cooling, grating and air venting

BEFORE designing the die, it is necessary to decide how the cavity, or cavities are to be arranged, and where the parting line or plane is to occur. In all cases, the parting must be so located that the casting is readily ejected. In general, it is at the maximum dimension arranged to be at right angles to die motion; but, where slides must be used, another location may be possible, if it appears advantageous.

In general, it is best to avoid using slides, as they add greatly to die costs. Some castings offer several options as to the way the casting should lie in the die; the designer selects the one which affords the lowest die cost consistent with high production of satisfactory castings.

Slides, besides adding to die costs, require actuation and locking and, as their use involves a secondary parting, extra flash removal costs may be incurred. Such dies may be slower in operation, and die maintenance costs are increased. Slides require good mechanical fits and, as some clearance is required, those dimensions influenced by slides cannot be held within as close limits as with solid integral portions of the die.

Slides are usually operated by angle pins fitting holes in the slides at the same angle and so arranged that the slides open automatically when the die is opened, and are closed and tightly locked when the die is closed. This works satisfactorily but pins are subject to wear and are used, as a rule, where motions are short. If the slide must have a long motion (as when it carries a long core which must be withdrawn) its operation may be hydraulic or by some means other than angle pins.

Slides are generally made with as small a cross section as is feasible, consistent with adequate strength and performance, since this tends to confine the flash within narrower limits. Flash always occurs, however, where the slide makes a joint either at the die cavity, or with another slide. Most slides operate parallel to the die parting, having one face in this parting, but can be operated at an angle to the parting, if necessary.

It is highly desirable that dies have flat partings in a single-plane, as this makes die construction easier and generally results in simpler, less costly flash removal, thereby helping to lower over-all costs. In many cases, however, an irregular parting is re-

Fig. 12—Cold chamber machine equipped with die for casting aluminum outboard motor cylinder blocks weighing 6¾ pounds each. Metal is cast around two steel cylinder sleeves which are inserted into the die before the start of the machine cycle. Note hydraulic core pull on front of the die. Courtesy Mid-Western Die Casting Co.

quired to permit removal of the casting from the die. Machining of such dies and companion trimming dies usually costs more.

Although cores are used to great advantage, they add to die cost because, in addition to making the core, which may be quite expensive, it must be fastened either to the die or arranged for motion in the die. Fixed cores commonly cost less, as they usually have a cylindrical shank which makes a press fit in a hole drilled in the die. If movable, the core again (as a rule) has a cylindrical shank but makes a close sliding fit in a mating hole which is drilled and frequently ground to size. Cores having axes in the die parting, are quite common, and then usually fit a cylindrical hole, half of which is in each main portion of the die.

Only in special cases can cores form undercuts and then only if locked into place or so made that they can be collapsed. In such cases, costs are high although they sometimes effect overall economies, assuming that the undercut is essential and machining on castings is saved. Undercuts can be produced by loose pieces that are ejected with the casting, knocked out, and later reinserted in the die. Although such "knockouts" are feasible, they slow the casting cycle and produce extra flash that is sometimes rather inaccessible and expensive to remove. Nevertheless, knockouts have utility and sometimes effect economies that more than offset extra costs. Also, they often make possible a single-piece die casting where, if no knockout were used, two separate castings, each requiring machining and assembly, would be needed.

Cavities in most die blocks are machined or "sunk" directly into the solid steel slab or forged block. In many dies, separate cavity blocks are made which, after the cavity is machined, are pressed into the die block. This is often done in multiple-cavity or com-

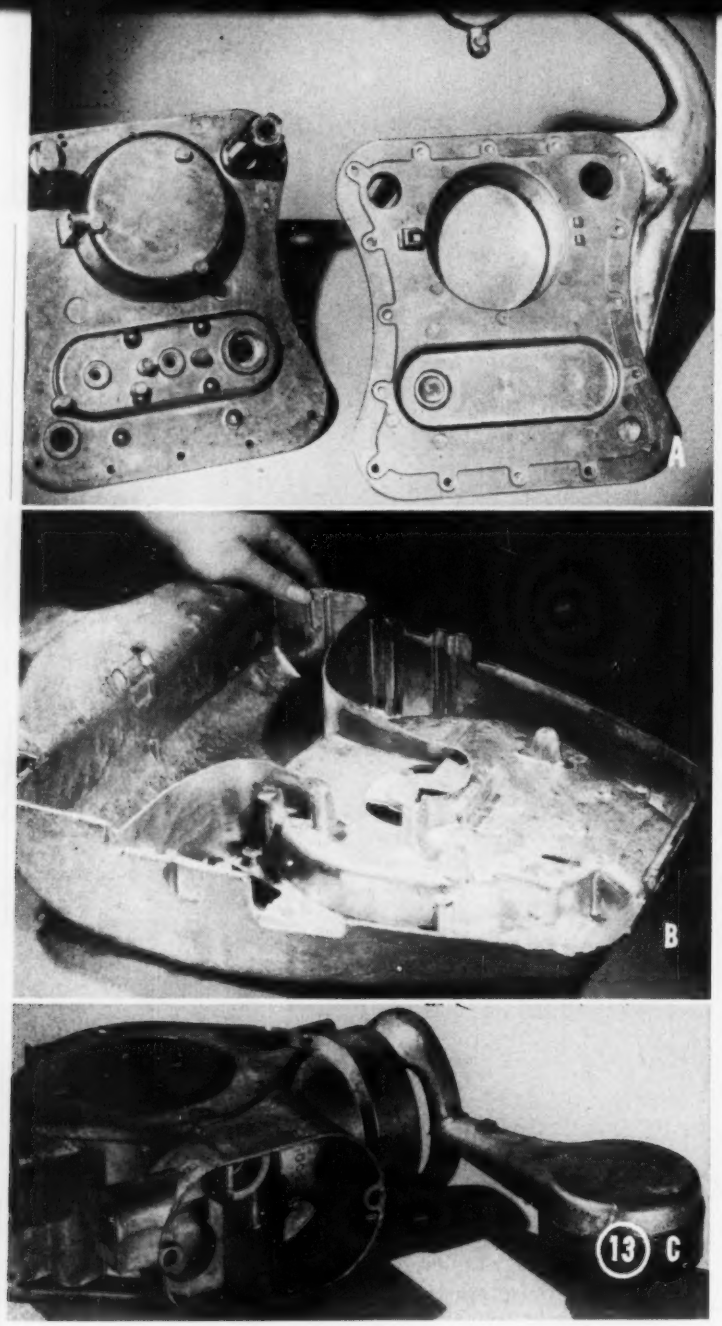


Fig. 13—Typical aluminum die castings illustrating various types of gating: A—Radio transmitter housing with side gate; B—vacuum cleaner main casting with wide end gate; C—Automotive carburetor part with ring gate. Parts courtesy Mid-Western Die Casting Co. and The Hoover Co.

bination dies for casting high-melting alloys where new (or rebuilt) cavity blocks are likely to be required before the die, as a whole, is replaced.

If the cavity is such that it is quite difficult or impossible to sink by common machining operations, it is often sunk by making a "hob" or hardened metal form that is forced under heavy pressure into a cavity block of ductile steel. The outside of the block is then machined and the cavity block, after hardening, is pressed into a holder.

Recently, cavity blocks were made by casting heat-resistant alloys by the "lost wax" process; considerable savings are reported over the usual machining methods; shapes very difficult to machine can be made. This method holds great promise for brass die casting.

Where several small dissimilar die castings are required for a given assembly, they may be produced in a combination die having a cavity for each part. Where a large number of small duplicate castings are needed, two or more duplicate cavities are made in one die. Such dies are called multiple-cavity dies. Since all cavities are filled at each "shot" of the machine, the labor per casting is exceedingly small and production correspondingly efficient.

When several small parts of similar outside dimensions are to be run in small quantities, cavity blocks are fitted into a die block having recesses for two to six cavity blocks, so arranged as to be equidistant from a common sprue or ram hole which fills all the cavities in each cycle of the machine. This arrangement affords flexibility not attained with fixed combination dies; any cavity portion can be changed when its run is completed and another cavity block substituted. Such dies are called "unit" dies, and they facilitate the efficient use of a large machine on either small or large dies.

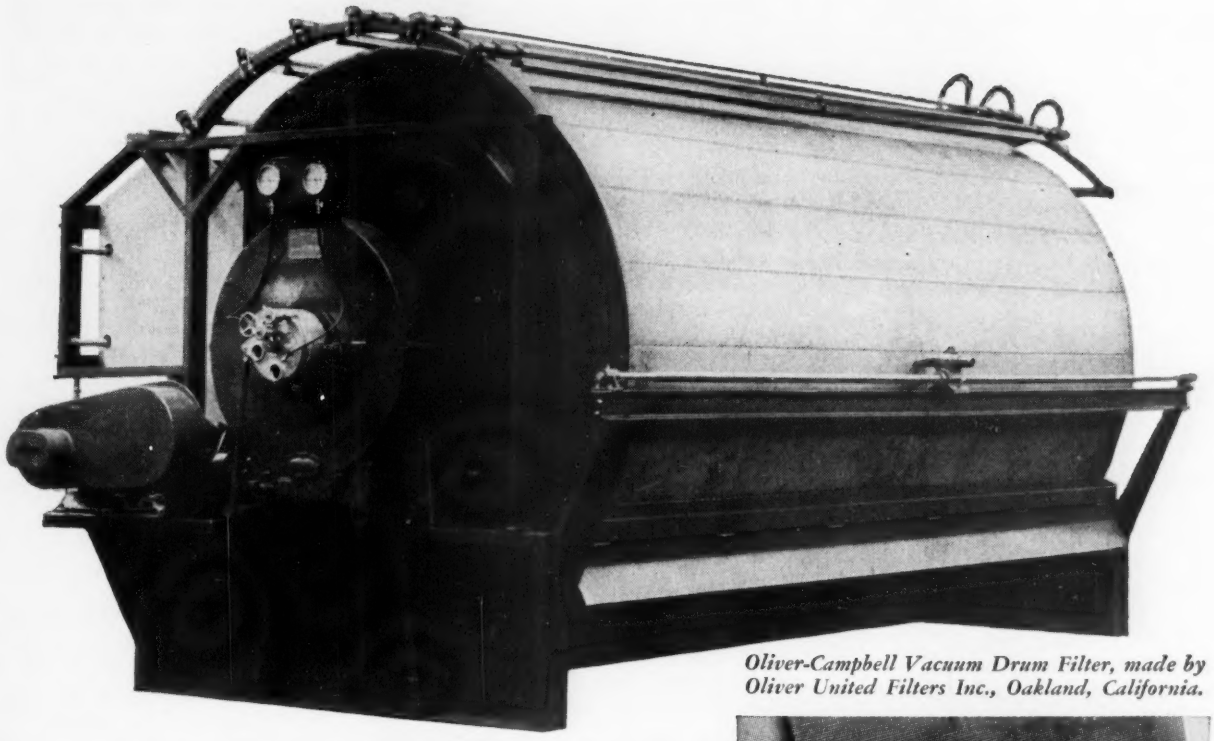
Dies Are Water Cooled

Most dies are water cooled to carry off heat and maintain the desired operating temperature, through channels that are drilled for this purpose. Size and spacing of the channels depend on the space available, upon the amount of heat to be dissipated and on the metal being cast. A die for heavy, thick-walled castings, requires more cooling than one for light thin walled castings.

Dies for high melting alloys require more cooling water than for low melting alloys although magnesium alloys, which have lower heat capacity per unit of volume, chill very rapidly. Dies for casting copper alloys are not always channeled for water because the temperature gradient may be too great. Instead, they are clamped against water-cooled platens or spacer plates to which the heat is then conducted.

From the foregoing it can be seen that die design involves a great many variable factors. There are no well defined rules for die design. One of the most difficult problems is how to get rid of the air in the cavity, without trapping it. If air is trapped, it results in voids or porosity which may make the casting unsuitable for its intended service, though it may not affect the utility of the casting unless the porosity is excessive or it occurs in critical locations on the die.

Although porosity may not be completely eliminated, it can be reduced to an insignificant minimum and confined to that portion of the casting where it is not detrimental, where stresses are light and any effect upon strength is of no moment. If the casting is to be heavily stressed, or must be free from such porosity as may cause leakage of gases or fluids, it may require considerable time to find ways of reducing or eliminating the porosity to a practical minimum or of confining it to such parts of the casting

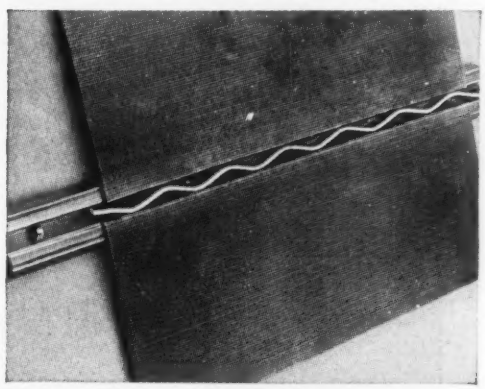


Oliver-Campbell Vacuum Drum Filter, made by Oliver United Filters Inc., Oakland, California.

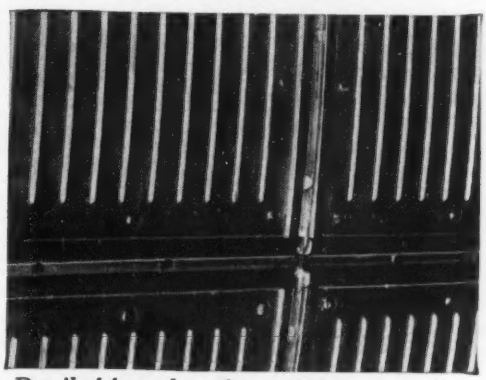
6 types of REVERE METALS in this vacuum drum filter

In the manufacture of this Oliver-Campbell Sugar Cane Mud Filter the following Revere Metals are used: Copper sheet, copper tube, brass sheet, brass discs, brass pipe, and brass extruded shapes. These metals are chosen for three chief reasons: they resist the corrosive action of the filtrate and cake, their mechanical strength is such as to assure durability, and they are quickly and economically fabricated. Use of extruded shapes is particularly interesting from a fabrication standpoint, the rather complicated forms required for the division strip being supplied by Revere in straight lengths that require only cutting and drilling before installation. Similarly, the zig-zag caulking strip that holds the screens is a Revere rectangular extrusion that needs only cutting plus formation of the zigs and zags. The screens, incidentally, are copper sheet, perforated 625 holes to the square inch.

Filtration is an important process, not only in sugar mills, but in a great many industries, such as chemicals, petroleum, coal, paper, cement, mining and refining, breweries, sewage disposal. Often both filtrates and sludges are corrosive, and thus it is that Revere Copper and copper alloys find many important applications. These metals are available in many different alloys and forms, resistant to a wide range of corrosive media. The Revere Technical Advisory Service will gladly collaborate with you in studying the problem of corrosion in your plant equipment or product.



Section showing method of locking copper screen into the extruded division strip by means of a zig-zag brass caulking strip.



Detail of formed or "bumped" brass screen support. The division strips are extruded brass sections.

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as are not adversely affected thereby. This is done by careful, patient and enlightened study of the casting and all of the variables affecting it, then trying die alterations accordingly.

In cases where gas leakage is not permissible, the castings are given 100 per cent pressure tests, and leakers are scrapped. In other instances, up to 100 per cent x-ray inspection is used to see that porosity is held within the necessary limits. Even for extreme precision applications, resort to such expedients is not often demanded, once dies are adjusted and the casting variables brought under proper control.

The chief features of die design and construction that affect porosity, or which can be altered to reduce or eliminate porosity to a minimum where it is insignificant, are those relating to gating and air venting of the die. The objective in so doing, is to fill the die by an orderly flow of metal without creating eddies, or trapping air in some other way. In some castings, this is readily accomplished but in others, only repeated trials, with different arrangements and sizes of gates and vents, yield the results that are satisfactory.

Even the most experienced die designers and die casters find gating and venting so difficult a problem that dies nearly always have to undergo at least minor changes in gating and venting before the die fills out as required and castings are satisfactory. Where castings are to be polished or plated, the surface finish must be as smooth as possible and as free from swirls or other surface blemishes as is feasible. If such defects occur, they require excessive time and labor in polishing and buffing.

Castings which have excellent surface finish may include considerable subsurface porosity, which may or may not be of significance. Conversely, some castings that are perfectly sound may have poor surfaces. Die temperature, metal temperature, metal composition, injection pressure and injection rate are among the factors other than gating and venting, that are known to affect results.

Gates which cause the molten metal passing through them, to be sprayed or spattered into the cavity, rather than entering it in a smooth, solid stream, are undesirable. Large gates of fairly uniform thickness (not thinned out at the end) are favorable in this and other respects. In long slender castings, some consider it better to have the metal enter at one end and not be directed along the length of the cavity, but rather across it to establish a more gradual or orderly filling with less spray or spattering.

In most castings, a single fairly large gate is probably better than two or more smaller gates, but certain shapes of castings may require two or more gates for satisfactory results. Many castings are produced with so called center gates in which the metal fans out from a central hole (such as a dial opening) to fill thin sections of large area.

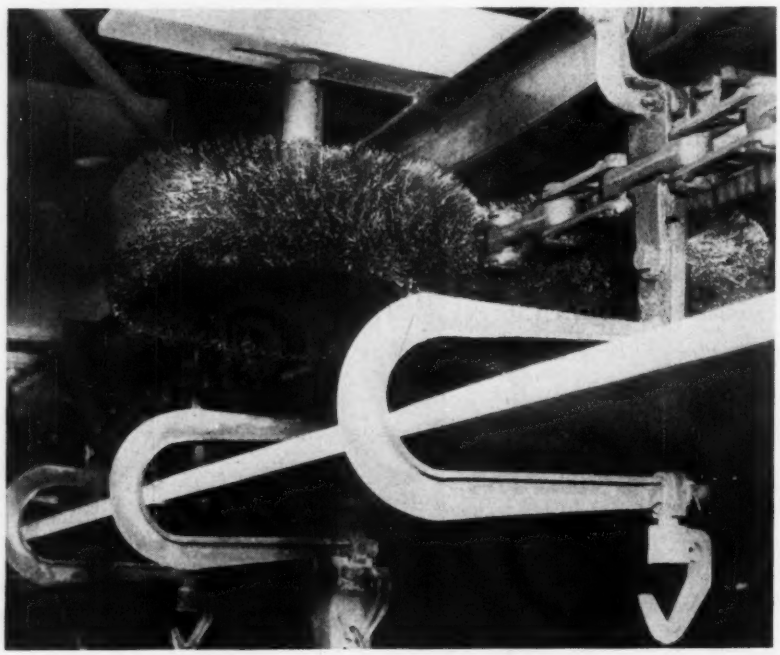
Exception To Single Large Gate

Dies for thin-walled castings may also constitute an exception to the general rule of a single large gate. Here the gate must be kept quite thin, because the casting itself has thin walls. If the gate is made thicker than the wall, it must cover an area beyond the edge of the casting and leave too prominent a blemish when sheared or cut off. In shearing such a thick gate in a trimming die, the wall of the casting itself may be broken rather than the gate and cause the casting to be rejected.

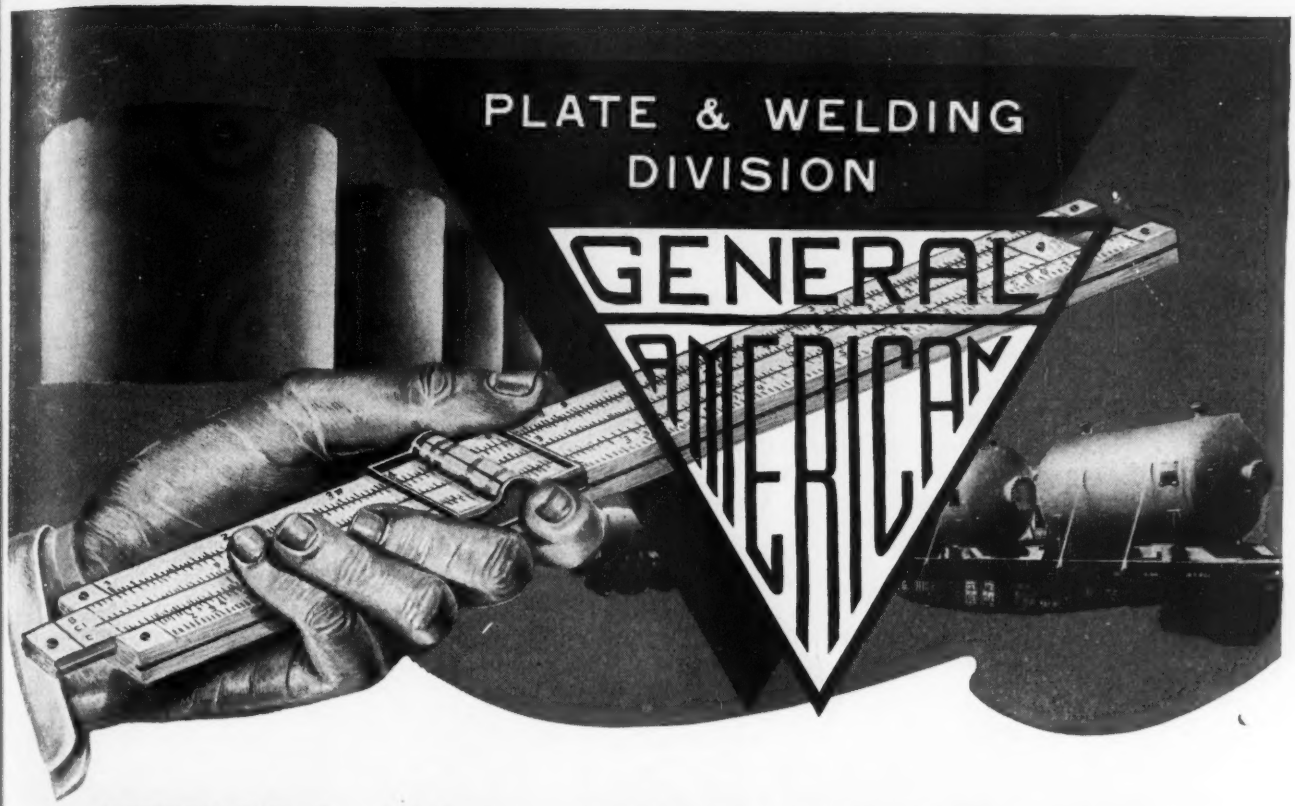
Gates are commonly made quite thin, thinner than the adjacent wall of the casting, as well as thinner than the runner feeding the gate. This makes it easier to break the casting at the gate, thus separating the casting from the runner, and the break is then sure to occur at the thinnest place, as desired. Some favor having runners rather short, fairly straight, and so proportioned that the sectional area grows progressively smaller until the gate is reached; this is believed to minimize or prevent turbulence within the runner.

The flow of hot metal through the gates should not be directed so as to impinge on the cores causing erosion, "soldering" and turbulence. In producing cylindrical castings having internal cores, these may have lengthwise parting with a ring gating around the lower end of the core, feeding the casting from the ring vertically at several points.

In making shell-like castings, it is sometimes desirable to have the metal flow into the cavity in the direction of the casting rather than in an angular or tangential line. This may be accomplished by flowing the metal over a hump in a semicircular arrangement, thus projecting the metal down the wall of the casting, elim-



CONVEYOR CHAIN DESCALER: Scale deposits on a conveyor chain which passes through a rust-proofing solution at one stage of an assembly process are now eliminated by brushes shown here in the refrigerator plant of General Electric Co., Erie, Pa. These circular wire brush sections, designed jointly by Osborn Mfg. Co., Cleveland, and GE engineers, are mounted on each side of the chain to contact it just after it emerges from the bonderizing bath. The brushes not only descale the chain, which travels at the rate of 27 feet per minute, but also cleans off excess grease, oil and dirt that accumulate in regular service



THINGS YOU CAN'T CALCULATE ON YOUR SLIDE RULE

Engineering problems solved in the laboratory are problems no longer — yet in steel and alloy plate fabrication there are factors where the right answers yield more readily to common sense than to the slide rule.

The integration of planning, design, fabrication and erection into one responsibility—the full utilization of laboratory and X-ray equipment—the desire to maintain an established reputation painstakingly built up over the years — the "know how" born of operating the world's largest privately owned tank car lines—all of these things are considerations you can't possibly calculate on your slide rule.

As a matter of fact, from the very first moment you begin to think about steel and alloy plate fabrication, it's common sense to think about the General American Plate & Welding Division.

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inating turbulence and air pockets.

Although these generalizations may prove helpful, it is more than likely that gating, however designed, will have to be altered after the die is built, unless a lucky combination of gating and venting proves entirely satisfactory when the die is first put into use. For this reason, it is better to start with a gate of somewhat smaller sectional area than is expected to yield best results; it is then easy to increase this area, by grinding, if trials indicate that a larger gate is needed. Gates can usually be made smaller by welding, but the operation is not so easily performed as grinding to enlarge the gate and it may result in local softening in the die.

Venting of dies is a feature of design upon which opinions differ, and there are no established rules. Vents are openings to permit the escape of air as the die cavity fills with metal. Usually, the vent or vents are at the main parting of the die; however, some air always escapes by intent or otherwise, at other partings or around movable slides or cores, when used.

Discharged Molten Metal a Hazard

Although vents must permit the escape of air, they must not permit the escape of any considerable amount of metal from the die. If they do so, the requisite pressure may not be built up, and the cavity may not be filled properly and satisfactorily. Also any significant tendency of a die to "spit," or discharge molten metal, constitutes a hazard to safety that must be avoided.

Vents usually have a thickness of about 0.005-inch and a width only sufficient to permit adequate flow of the air. Some metal does flow into vents but, as they are so thin, the metal freezes almost instantly and stops further flow. This metal forms flash, which is trimmed off the casting, with other flash.

Where "straight" venting of dies is not satisfactory or where there are indications that added venting will aid in filling out the casting, or in avoiding surface imperfections near to a vent, the volume of the vent is often substantially increased by providing an overflow well just outside the die cavity. Such a well or small cavity is a depression in the parting face of the die and is connected to the cavity by a thick vent. The well is also vented so that the air and some metal will overflow the die cavity and enter and fill the well.

Overflow wells are thus small reservoirs in the venting system; several are often used around a die cavity. They are an asset in that they commonly help to produce castings of less porosity and fewer surface imperfections. Since these wells are connected to the casting by flash, they come away from it and are trimmed off.

The gate is joined to the sprue or ram hole by a runner which is a channel cut in the movable die on the parting face since the runner must come free with the casting, when ejected. When the die has more than one cavity, there must be a separate runner to each or a runner having a branch into each gate.

Requirements of Runners

Runners are commonly made as a flattened ellipsoidal section or are made flat on the outer or wide side and rounded on the ends of the section. Runners should have a sectional area considerably greater than that of the gate or gates they feed and the area should decrease gradually, without any steps, in the direction of flow. Walls of runner passages should be smooth and blend into the gate so as not to create eddies in the flow of the metal approaching the cavities. If the gate must be curved rather than straight, the curve should be gradual, without sharp bends.

In most submerged plunger machines (used chiefly for zinc alloys) the hot metal nozzle is commonly at the center of the platen, or it may be 4 or 6 inches below center, depending upon machine size. The sprue hole in the cover die must lead to the hole in the nozzle. This sprue hole is tapered and is smallest next to the nozzle, so the sprue breaks off there as the die opens. The taper is quite large, so that the casting is easily freed from the cover portion of the die.

A rounded conical-shaped sprue pin is located on the movable die so as to project into the center of the sprue hole, and acts as a fixed core, making the sprue a hollow cone, insuring smooth flow and decreasing the weight of metal to be remelted, after sprue and runners are removed from the casting. The sprue pin may be water cooled.

In cold chamber machines, the runners are machined directly from the injection chamber to the cavities. Excess metal forms a slug or "biscuit" of plunger diameter. This insures high final pressure at the end of the injection stroke. The injection chamber is located at the center of the platen or 4 or 6 inches below center, and the dies are so designed that molten metal connot flow by gravity into the die cavities but always flows by positive displacement from the injection plunger.

All dies should be designed so that the center of pressure within the die is in alignment with the center of the machine's clamping force, thereby minimizing any tendency to cock the die, causing excessive flash, in addition to subjecting the machine's structure to heavy strain.

In large cold chamber machines, the die is located on an extension of the cold chamber beyond the platen and extends through the cover die. In small machines, a die bushing is provided which must be in alignment with the bore of the cold chamber.

As the die in a cold chamber machine is opened, plunger is not withdrawn but pushes the biscuit and gate of the castings out from the cover half of the die against the movable die; plunger then withdraws before the ejector advances to push the castings from the ejector portion of the die. Some dies have a large ejector pin that bears on the biscuit, in addition to those that bear on the casting and runners.

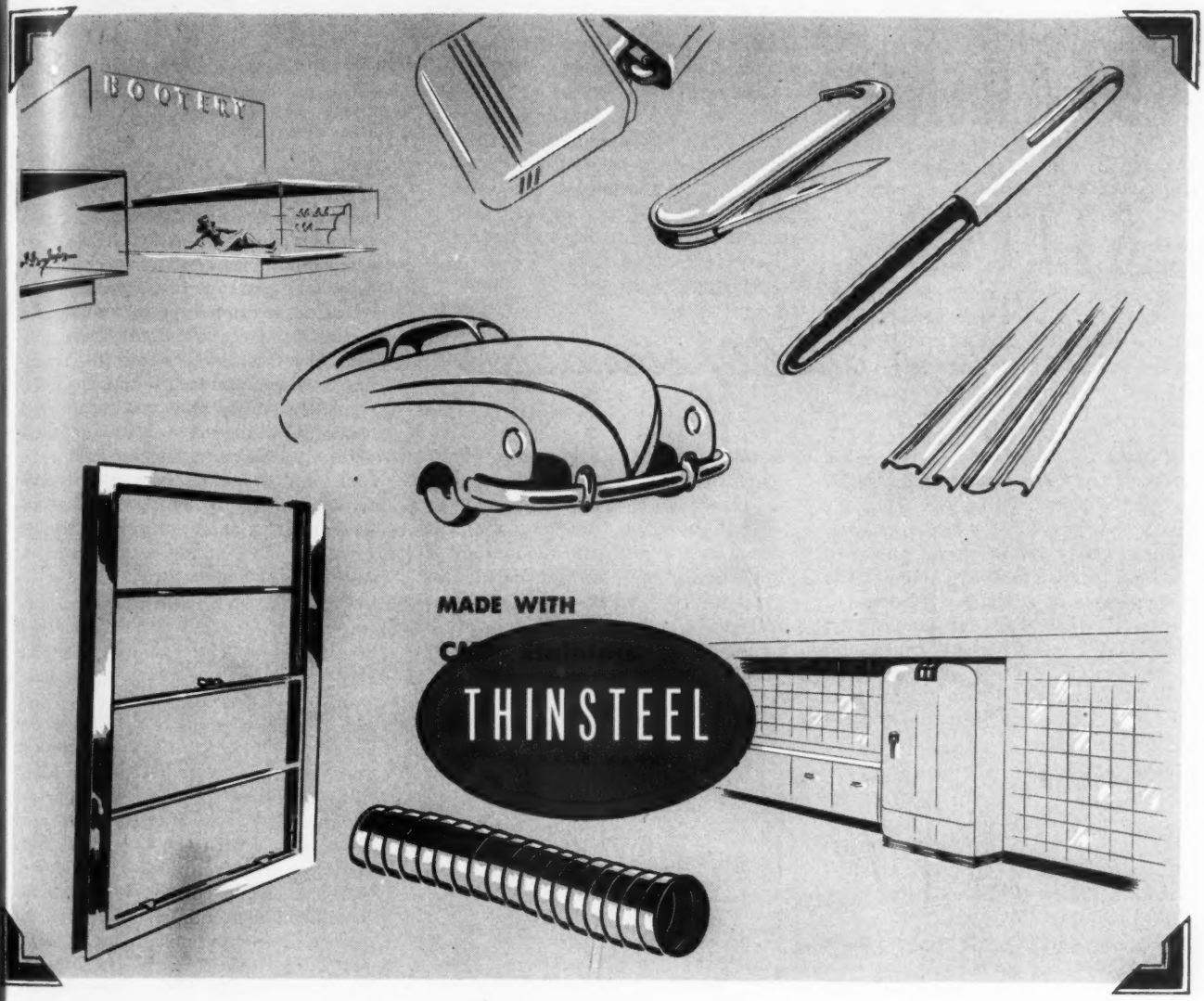
(To be concluded)

Radio Frequency Power Cuts Hardening Costs

Improvement in quality and reduction in cost of hardening grass shear blades was noticed by Hancock Mfg. Co., from the installation of a 10 kilowatt, 450 kilocycle radio frequency generator, built by Westinghouse Electric Corp., Pittsburgh. As edges of the blades are hardened, instead of the whole blade as was the case with the former method, little distortion was said to be present, thereby eliminating straightening after the hardening.

With a production of 900 blades per hour, cost of hardening per unit was reduced from 2½ cents to 1 cent. Hopper of the work handling equipment holds a 3 minute supply of blades, sufficient to give the operator time to refill it and to remove the hardened blades from the quench tank.

Blades are automatically pushed out from the bottom of the stack in the hopper, positioned with the cutting edges in the inductor coils, exposed to 3.5-second surge of radio frequency power, then ejected into a basket in the quench tank. Generator and work handling equipment is shut down by a safety device if the hopper empties, a blade jams or if the generator should become overloaded.



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BEARING STEELS

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By E. M. TAUSSIG and C. B. COBUN
Service Metallurgists, Alloy Div.
Carnegie-Illinois Steel Corp., Subsidiary
United States Steel Corp.
Pittsburgh

ROLLING motion as a means of overcoming friction was first utilized in prehistoric times when man devised the wheel. It was not until comparatively recent times, however, that we learned how to eliminate the power-consuming sliding friction between a wheel and its axle. This simple innovation, consisting of an assembly of balls or rollers which roll between concentric adjoining surfaces, is called the antifriction bearing.

Because of the high quality standards required in steel for precision ball and roller bearings, the major portion is manufactured in the basic electric furnace. Special melting practices have been developed to meet these requirements. Steel is melted from carefully selected material and close control of the bath is exercised during the initial melting and working period. Condition and composition of the slag and the timing of additions during the final period prior to tap are extremely important factors. Tapping and pouring temperature are held within narrow limits and the condition of ladles and molds is carefully checked. In addition, rolling practices, finishing temperatures on the mill, the amount of ingot discard and the preheating and slow-cooling cycles used, all exert a marked influence on the soundness and inherent uniformity of the final product.

Metallurgical control of alloy steels produced to bearing quality standards involves extensive testing throughout the processing. Macroetch and fracture tests are carefully examined to determine soundness, i.e., carbide segregation, and nonmetallic inclusions. Cleanliness tests are taken from representative positions, examined microscopically and rated to determine the number, size, and distribution of each type of nonmetallic inclusion. Only when the tests indicate that the steel meets the specified quality standards, can the steel be released for shipment to forgers or for rerolling on bar mills. After rolling to final size, further etch, fracture, and cleanliness tests are ordinarily taken. In addition, when annealed material is specified, the steel must be checked for decarburization, hardness and structure.

For More Data on Antifriction Bearings, See STEEL:

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Case-hardened bearings are produced from several alloy carburizing steels as outlined in the accompanying table. The principal grade used, however, is 4620 containing 1.65 to 2.00 per cent nickel and 0.20 to 0.30 per cent molybdenum. Thorough hardening bearings are made from the 52100 type or slight modifications thereof containing approximately 1.00 per cent carbon with the chromium content varying from 0.40 to 1.65 per cent. In some cases the manganese or silicon contents are increased to impart deep hardening or other special properties. In rare cases molybdenum, vanadium or aluminum are added.

Steels in any of these grades are available in a variety of forms for bearing parts, including hot rolled billets, bars or rods, spheroidize an-

APPLICATIONS OF CONSTRUCTIONAL ALLOY STEELS IN BEARINGS

GENERAL CLASSIFICATION	CARBURIZED		THOROUGH HARDENING
Mechanical Properties	125,000 to 160,000 psi. in core	150,000 to 220,000 psi in core	250,000 to 300,000 psi Surface Hardness R_c 62 minimum when hardened in full cross-section.
	60-64 R_c case hardness		
Processing	Anneal or normalize and draw. Machine and rough grind. Carburize, direct quench, or slow cool. Reheat, quench and temper at 275°F to 250°F. Finish grind.		Spheroidize anneal. Machine and rough grind. Oil quench and temper 300°F. to 400°F. Finish grind. Heavy sections occasionally water quenched.
Requirements	High stresses under radial and thrust loads at medium speeds. High endurance and toughness.	Heavier sections or higher stresses. Maximum endurance and toughness.	Heavy loads at medium speeds or medium loads at high speeds. Maximum endurance.
Applications	Rollers, cups, cones and races for roller bearings of straight or tapered design.		Balls ½" and under; Balls light rollers; Balls over 1" Rollers & races.; Heavy rollers and races
Ni Cr		3310	
Ni Cr Mo		4320	
Ni Mo	4608-15-20		
Cr			50100* 51100* 52100* 52100 Mod.
Remarks	Electric Furnace is generally required to meet the degree of cleanliness specified.		Electrc furnace because of severity of application and the degree of cleanliness required. * These grades commonly ordered to ASTM Spec. A-295-46T

nealed or normalized bars for machining or cold heading, and spheroidize annealed, rough turned or centerless ground bars for automatic machining into rollers or races.

Care matching that of the steelmaking should be exercised in the forging, normalizing, and annealing of bearing steels. To obtain the best results in forging, it is recommended that the steel be preheated and raised to the forging temperature very slowly. It should be suitably slow-cooled to prevent internal ruptures. A normalizing treatment should be used on the forgings, followed by an annealing treatment. On some carburizing grades a normalize followed by a high temperature draw often yields the best microstructure for machining. On the thorough hardening types, a spheroidize anneal is employed to yield a fully spheroidized microstructure free from elongated carbides and pearlite. Spheroid size is also important, as nonuniformity of carbide size and shape affects machinability as well as the solution rate during hardening operations.

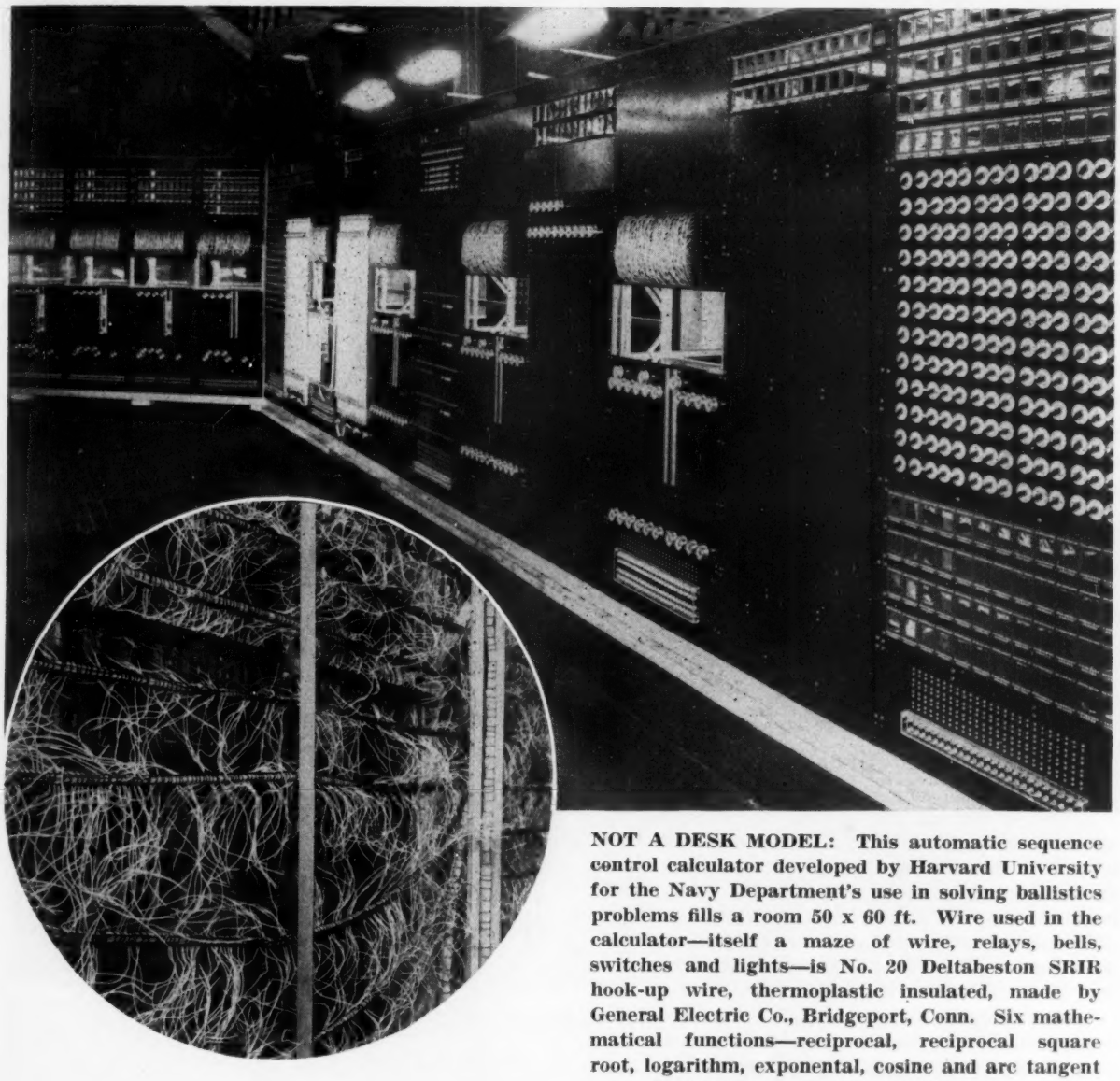
Rapid development of the antifriction bearing during the past half century to its present high precision standards may be attributed to the modern designing and manufacturing skill of the bearing manufacturers and to the increased knowledge of modern metallurgy which produced the fine steels found in present day ball and roller bearings.

Stainless Steel Piping Booklet Made Available

Of interest to piping engineers is the booklet, "Stainless Steel Piping—Why and Where to use it," Written by J. D. Mattimore, chief engineer, product and research division, Tube Turns Inc., Louisville, it covers types of stainless steels, reasons for using stainless steel piping, standardization of pipe and fittings, selection of pipe joints and fabrication by welding. Also contained in the booklet are numerous tables and illustrations.

—o—

Virtually all types and grades of tool and die materials from the old Pompton through the much newer cemented carbide alloys will be featured in the Allegheny Ludlum Steel Corp. exhibit at the American Society of Tool Engineers industrial exposition in Cleveland, March 15-19. Examples of tools and dies will be exhibited around the theme of combining carbides with tool steels so that the best features of each will complement the function of the other.



NOT A DESK MODEL: This automatic sequence control calculator developed by Harvard University for the Navy Department's use in solving ballistics problems fills a room 50 x 60 ft. Wire used in the calculator—itself a maze of wire, relays, bells, switches and lights—is No. 20 Deltabeston SRIR hook-up wire, thermoplastic insulated, made by General Electric Co., Bridgeport, Conn. Six mathematical functions—reciprocal, reciprocal square root, logarithm, exponental, cosine and arc tangent —are built into the machine which figures in split seconds problems in billions

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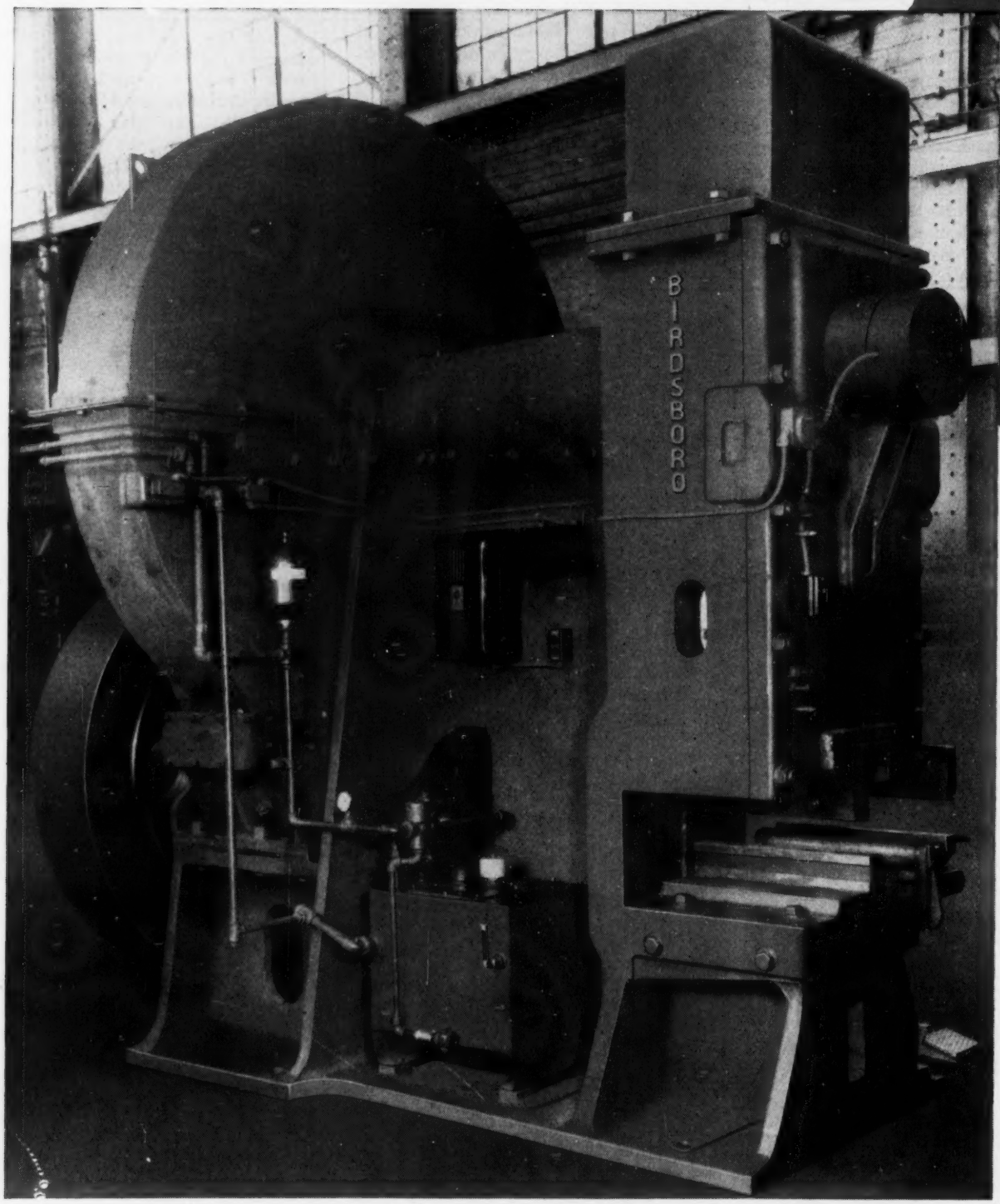

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• If you are interested in stepping up production, don't pass by this Birdsboro Cold Bar Shear which has a tremendous capacity for top output at minimum operating and maintenance costs.

This 175 ton, heavy duty, special, open throat shear handles merchant bars and shapes up to 2½" square and other sections of equal area at a rate of 20 cuts per minute.

There is an abundance of power, speed and ruggedness built into this machine which accounts for its dependable, day-after-day operation on the toughest kind of jobs.

The machine shown here has a fully enclosed flywheel powered by a 20 hp. motor with a V-flat drive. All bearings are of high grade bronze except the main pinion bearings which are of anti-friction type. The main gear and pinion are totally enclosed and running in oil. The shear has a hydraulically operated non-knocking clutch and motor operated lubricating system.

This Cold Bar Shear is only one of many types of machines designed and built by Birdsboro. Our engineers will be glad to work with you when you are considering the installation of steel mill equipment.

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STEEL MILL EQUIPMENT

DESIGNERS and BUILDERS of: Steel Mill Equipment • Rolls • Hydraulic Presses • Special Machinery • Crushing Machinery • Steel Castings

Separating Alloys—*Concluded from Page 91*

ished, but not necessarily with the same spot test. All pecentage compositions given in this article are approximate.

Instead of specific spot tests for the large differences in iron or copper, it was found that a mixture of equal parts of H_2O, HNO_3 an HC1 gave a "green spot" and a "colorless spot" respectively, directly on the metals

portant to have *only* S-816 present with the Hastelloy B and Timken. In this case, there was no question of having Nichrome in the same area as S-816, since their application to finished products was different.

In example 4, the first requirement was to reject all magnetic material and then to separate only the 17W from the others. A drop of an equal

EXAMPLE 1

	Ni	Cr	Fe	Mn	C	Si	Cu
Inconel	75	13	9	1	.15	.5	.5
Nichrome	57	16	22	3	.25	.9	..

EXAMPLE 2

	C	Si	Mn	Cr	Ni	Mo	W	Cb	V	Fe
S495	.4	.6	.5	14	20	4	4	4	..	Bal.
Hastelloy B	.1	.5	.5	..	65	28	..	..	.35	6
17W	.5	.7	.6	13	19	.6	2.3	..	..	Bal.

EXAMPLE 3

	C	Si	Mn	Cr	Ni	Mo	W	Cb	V	Co	Fe	N2
Hastelloy B	.1	.5	.5	..	65	28	.	.	.35	...	6	..
Timken	.1	.5	.5	16	25	6	.	.	..	...	Bal.	.15
S-816	.4	.5	.5	20	20	4	4	4	..	Bal.	5	..

EXAMPLE 4

	C	Si	Mn	Cr	Ni	Mo	W	Fe	Ti	Cb
17W	.5	.7	.6	13	19	.6	2.3	Bal.	.	.
18-8 Mo	.1	.5	1.7	18	8	2.7	..	Bal.	.	.
18-8 Ti	.1	.5	.7	17	8	..	..	Bal.	.4	.
18-8 Cb	.1	.4	1.4	18	11	..	..	Bal.	.	.7

EXAMPLE 5

	C	Si	Mn	Cr	Ni	Mo	W	Cb	Co	Fe
S495	.4	.6	.5	14	20	4	4	4	...	Bal.
72	.2	.8	1.3	5	53	17	6	.	6	11
Vitallium	.3	.6	.6	27	2	6	.	.	Bal.	1
61	.4	.6	.6	23	2	..	5	.	Bal.	1
6059	.4	.6	.6	23	32	6	.	.	Bal.	1

when 1 drop was applied and noted within 2 to 3 minutes.

With a mixture of equal parts of of H_2O, HNO_3, HC1 and $HC1O_4$, a drop applied to the metal surface gave (within 1 minute) with S495 a light yellow spot, with Hastelloy B a blue spot and with 17W a dark brown spot. Note example 2.

It was noted that with all separation work where Hastelloy B was involved with other alloys, a blue color would develop practically, regardless of the acid mixture. This was a great value if three or more alloys were involved. If alloy M and N gave similar colors with one part of H_2O to one part of HNO_3, but different colors if two parts of HNO_3 were used, it was certain that Hastelloy B would not "interfere" but would still give its characteristic blue.

With a mixture of equal parts of H_2O, HNO_3 and HC1, a drop applied to the metal surface gave (within certain that Hastelloy B would not spot, with Timken a light yellow spot and no reaction with S-816. See example 3.

Here is a case where the acid mixture was chosen so that it would be too weak to react with one of the alloys leading to a "colorless spot." Compare the acid mixture with example No. 1 and note that Nichrome gave a "colorless spot." Thus it is immixture of HF and HNO_3 gave a black color on 17W, while the others remained light yellow.

It was also found that all alloy stock within the particular building would not give a black spot, except plain steels. Since one of the requirements was that material be nonmagnetic, this preliminary test automatically removed any plain steels at the same time. Further, it should be noted that the spot test only worked on forged material and gave colors blending with those of the other alloys when raw stock was tested.

At the same time, a spot test was necessary to separate the 17W from the other alloys in the raw stock state. To this end it was found that a small amount of $KMnO_4$ and $KC1O_3$, mixed with equal volumes of HC1 and HNO_3, gave a black spot on the 17W and yellow on the others; but when this was tried on forged material 17W gave the same color as the others. This illustrates the necessity of defining conditions before a spot testing instruction is issued and is given as an indication that when a spot test is being developed, materials that exactly fit the shop condition be used as standards.

An illustration of a spot test just bordering on specificity is given in the case of two plain steels of exactly similar composition, except that one contained 0.03 per cent sulphur for free-machining properties. A drop of HC1 was placed on the steel and a piece of lead-acetate paper held over the spot. The development of a brown coloration within a minute indicated the presence of sulphur in the material. Since it was known that no selenium was present in either material to interfere, the test was called conclusive with the development of brown coloration.

A case where a specific spot is used as secondary measure is indicated in example 5.

A drop of a mixture of one part of HNO_3 to two parts of HC1 gave a green spot with S495, a yellow spot with 72, a colorless spot with vitallium, and indistinguishable light blue spots on 61 and 6059. These latter two were then identified by blotting the spot and adding several drops of an ammonium hydroxide-ammonium acetate solution of dimethylglyoxime, which gave an intense red color with 6059 and under the conditions used, practically no color with 61.

Many other examples and identifications by a process of elimination have been devised and are in practical use on both ordinary and restricted alloy materials. These tests, however, show the advantage of arbitrary spot tests as a valuble tool in solving mixed stock problems and the continued identification of incoming materials.

Tool Steel Data Featured in Catalog

Containing many unusual features for practical shop use, a new pocket catalog of working data on high speed steels and tool and die steels is available from Latrobe Electric Steel Co., Latrobe, Pa.

Condensed description, heat treatment and application data on the most widely used products are contained in the 80 page booklet. Classifications include high speed, hot work, shock and chisel, die casting, water hardening and carbon steels. Shop information covers numerous weight, conversion and related tables.

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Two new hydraulic controlled bulldozers capable of performing numerous tasks in tight places around the mill or factory were recently announced by Caterpillar Tractor Co., Peoria, Illinois. One of the bulldozers is an angling blade and the other is a straight blade. Both are designed for exclusive use with the diesel D2 type tractor manufactured by the company.

DANLY Special Purpose Straight-Side Presses

PERMANENTLY inclined to 23 degrees, this eccentric gear press shows one example of the adaptations of Danly Straight-Side Presses which can be built to fit your needs. The frame is of four piece tie rod construction. Its clean modern design facilitates rapid loading and unloading and easy scrap removal.

Large square back gibs provide an ample bearing surface to keep the slide in perfect alignment. Air cylinders enclosed in the uprights adequately counterbalance the weight of the slide, gear train and dies.

Danly Circulating Filtered Oil System brings the *right amount* of clean, pump-driven, filtered oil to all gears, bearings and driving members in the crown and slide, *including the flywheel bearings*. Lubricating the flywheel bearings in this way makes it unnecessary to manually lubricate this member at the top of the press.

Safety is assured by the fully enclosed construction of this press, by the two-wire electric control system, and by Danly's cool running air friction clutch which provides instant starting and stopping of the driving machinery.

You can get further information on the type of press shown here or on any one of a complete line of Straight-Side Presses by writing or calling Danly's Press Division.

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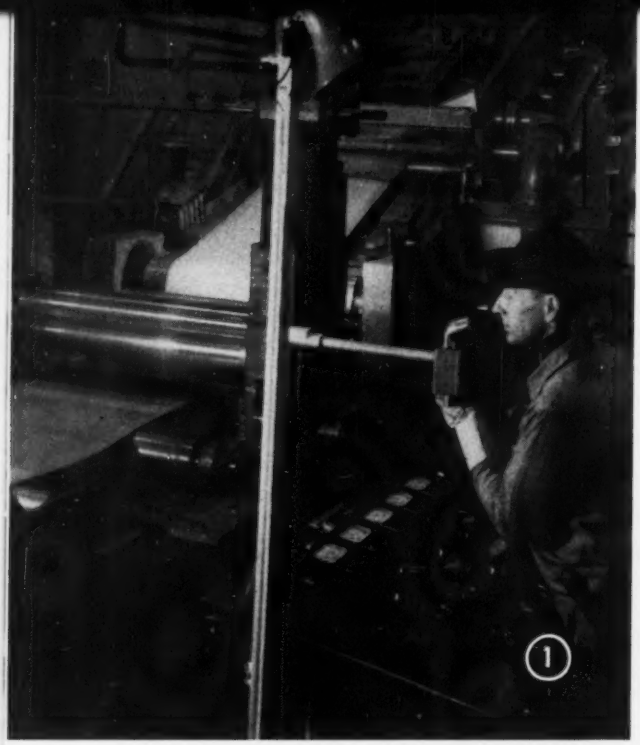


Fifteen-Ton Coils

Handled by New High-Speed Cold Mill

Five-stand tandem mill delivers strip at 70 miles an hour making it the fastest installation now in service or under construction. Twin motors drive top and bottom work rolls. Mill and reel motors with capacity of 16,850 horsepower represent most available horsepower ever connected to a single cold mill

ONE of the most advanced 5-stand tandem mills for producing cold reduced strip in tin plate gages and widths now is in commercial operation at the Aliquippa, Pa. plant of the Jones & Laughlin Steel Corp. The mill will roll to minimum gages of 0.008-inch and less, and up to 36-inches wide from pickled hot rolled strip of up to 0.109-inch gage in coils that will finish 16 inches inside diameter up to 66 inches outside diameter maximum, and up to 30,000 pounds maximum weight.

Built of the heaviest construction of any tandem cold strip mill for tin plate gages and for the highest speeds of any strip mill, a 15 net ton hot rolled coil almost 6 miles long, is rolled under controlled tension and pressure conditions on the 5-stand unit in about 5 minutes when operating at its unprecedented maximum nominal speed of 6000 feet per minute. Higher speeds have actually been attained.

The mill housings weigh 120 net tons each and have column sections 30 x 38 inches or 1140 square inches. The driven work rolls are 21½ inches diameter when new, with a length of face of 42 inches and are mounted in 4-row pin-type Timken bearings. The backup rolls are 53 inches diameter with a 42-inch face and are mounted in Mesta oil bearings of 3,000,000 pounds capacity each.

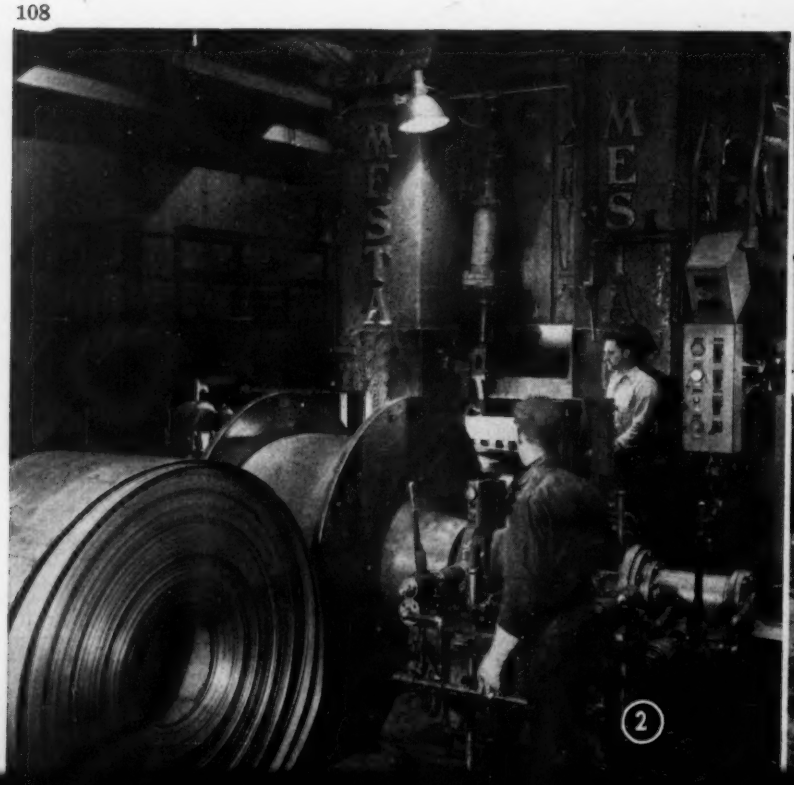
The speedy screwdowns have 400:1 total ratio and are operated by two 75-horsepower motors, the largest capacity screwdown motors used by any tin plate tandem mill and arranged for operation at over double voltage. The screwdowns on all stands have Ward-Leonard control. They also have rotating type regulation for load limit control making their screwdown action the fastest in response and the fastest in speed of any tandem mill.

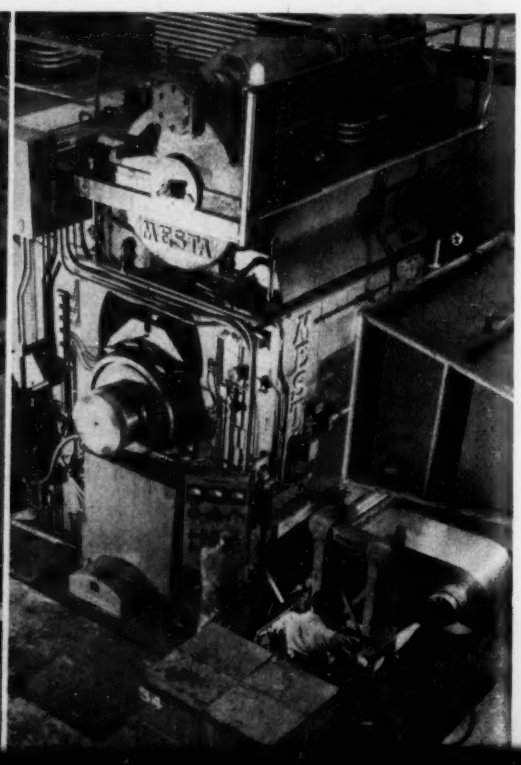
Between each pair of stands is

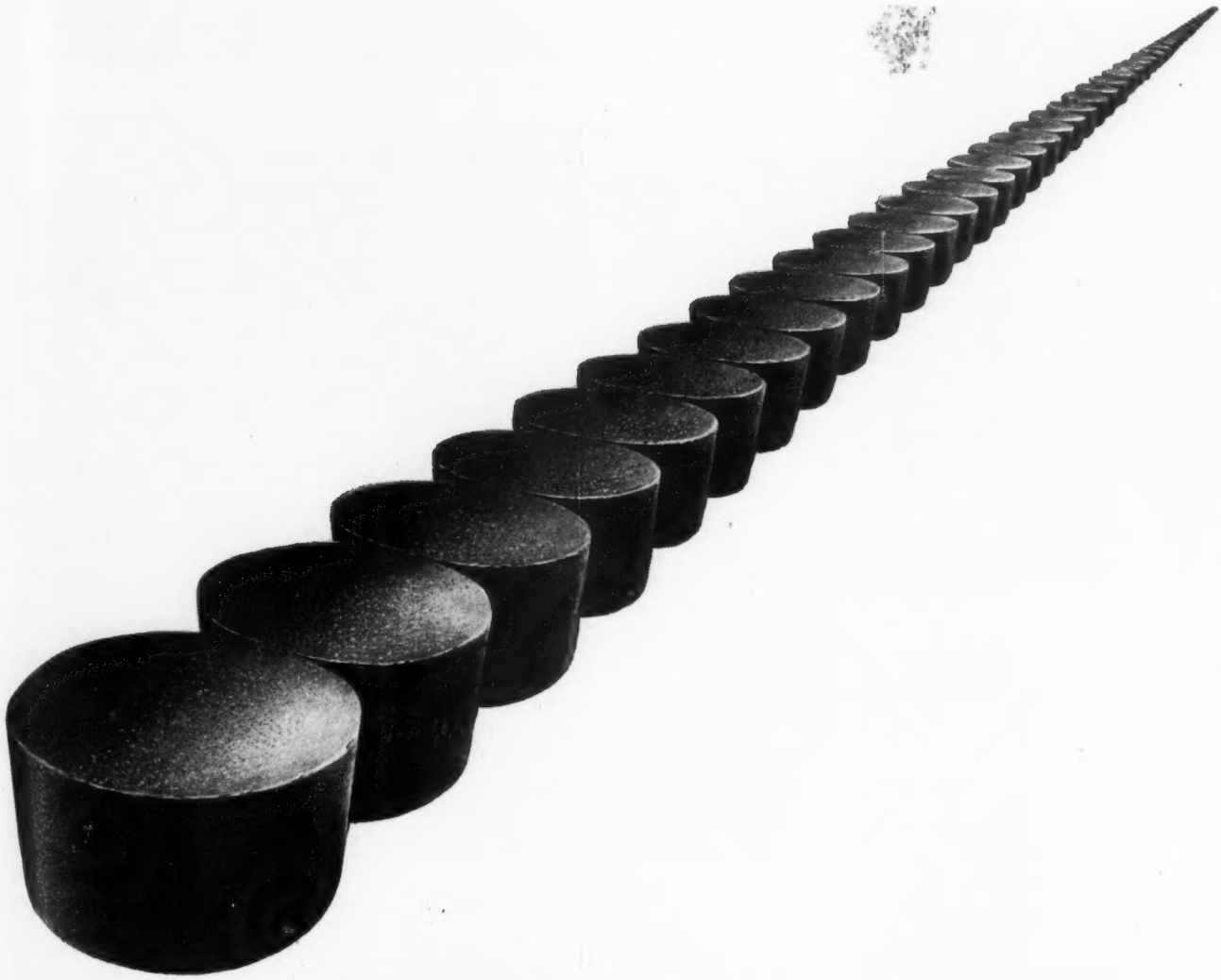
Fig. 1—Loud speaker system facilitates control of continuous pickle line

Fig. 2—Coil being fed into first of five stands of tandem rolls

Fig. 3—Discharge end of mill showing large capacity screwdown motors







Timken used 45,000 Carbon Mold Plugs

_THEN SAID:

*"Carbon plugs are never out-of-round and are consistently accurate in dimensions. They are structurally strong and may be handled without damage . . . can be hammered into place in the mold opening without being crushed. A large percentage may be employed a second or third time.

"Their use has eliminated 90 pct of the leakers . . . absence of leakers has reduced steel loss to a minimum and has prevented the burning of mold buggies and railroad ties and rails under the mold buggies. Reliance on the plugs has improved pouring conditions by eliminating stop-pours, skulls, sticking blackheads and other pouring difficulties.

"Carbon mold plugs do not spall. There can be no refractory absorbed into the ingot from the plug, which practically eliminates the possibility of inclusions from the mold plug. Little or no carbon pickup is noted in ingots of steels over 0.10 C.

"Elimination of burn-outs in the plug holes has improved mold life by 10 pct. There is no contamination of soaking pit bottoms if the carbon plugs adhere to the ingot bottom. As compared with any other plug of the same size, the carbon type is light and very easily stored or handled . . . a decided advantage has been gained in producing alloy steel of the best quality."

**From an article entitled, "Carbon Mold Plugs . . . In Alloy Steel Production" which appeared in the November 27, 1947, issue of* Iron Age.

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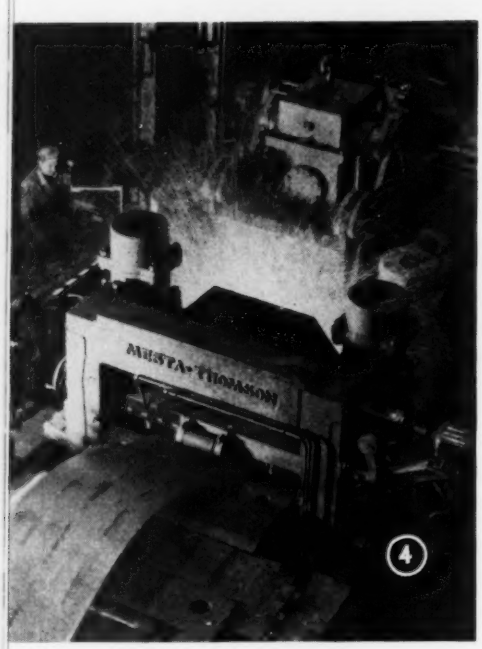
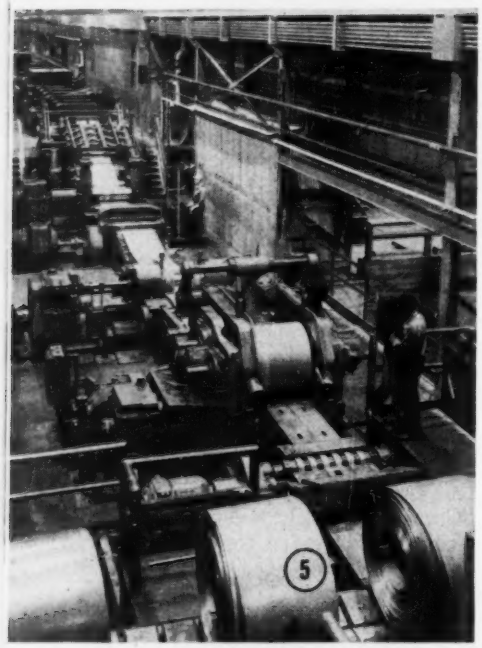




located an indicating electrical tensiometer as a guide in tension control. A tensiometer is also used after the fifth stand to indicate the pull on the strip by the tension reel.

Between the first and second stands there is a deep throat electrolimit gage or flying micrometer for automatic gage control of strip at this point. After the fifth stand there is an x-ray gage to measure the thickness of the finished product.

The mill drives are unique. No. 1 stand has a conventional single motor drive through pinions. No. 2 has a double armature direct drive through pinions. No. 3 has a twin drive with a separate single armature motor independently driving each work roll through 1/1.525 ratio speed increasing gears. The No. 4 drive is similar to No. 3 but with one-half ratio speed increasing gears. No. 5 has a twin drive with a separate double armature motor independently driving each work roll through one-half ratio speed increasing gears.

Two independent sets of speed increasing gears for each of stands No. 3, No. 4 and No. 5 are mounted in a common housing. This is of one piece casting construction with separate caps for each pair of gears. Gear diameters were held to a minimum and 3-bearings construction used to give maximum rigidity.

Data on the drives are shown in the accompanying table.

While the total nominal capacity of the six mill and reel motors is 16,850 horsepower, a total of 20,100 horsepower can be carried continuously without overheating because of special insulation used. This is the first 5-stand tandem mill to have separate drives on each work roll of the last three stands.

Through motor design, twin drives, double armature motors, and drive gear construction, it has been possible to produce a mill with phenomenally low WK^2 (flywheel) effects and which permits maximum rates of acceleration and deceleration. As a result, the mill can be accelerated from a threading speed of 300 to 4500 feet per minute in only six seconds. This saves time on the mill and reduces the amount of off-gage strip resulting from speed changing conditions.

The mill is also unique in being the first tandem mill to go in with a separate generator for each stand. There are two main drive motor-generator sets, each driven by a 10,000-horsepower synchronous motor and each with 3 direct-current generators. The three generators of one set serve stands Nos. 1, 2 and 3 and the three of the other serve Nos. 4 and 5 and the tension reel. Total generator capacity is 14,200 kilowatts. This arrangement gives the maximum flexibility of speed matching for any desired rolling schedule within broad limits.

In order to control the mill drives, the most modern type of equipment utilizing rotating regulators has been installed.

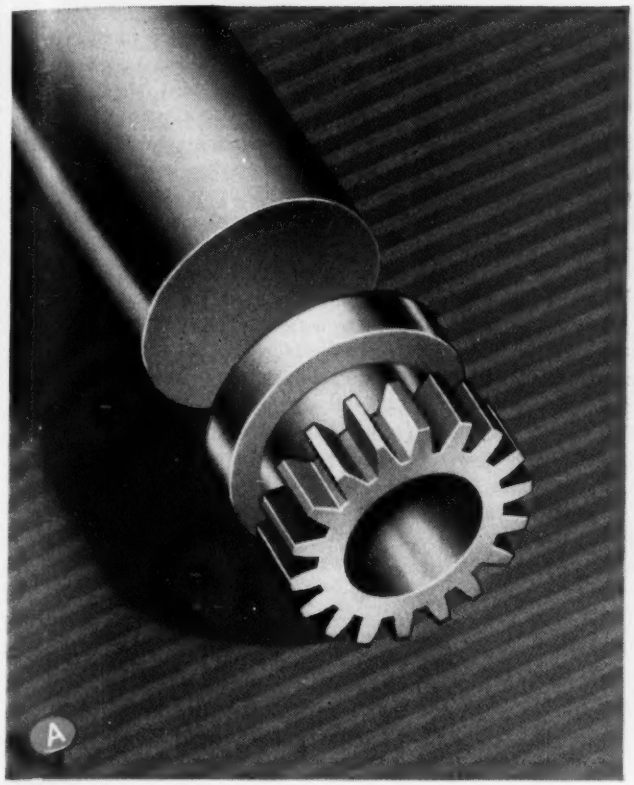
Dissipation of the vast amount of energy of such a mill transformed through the work of rolling into heat makes necessary the use of great quantities of cooling water on the

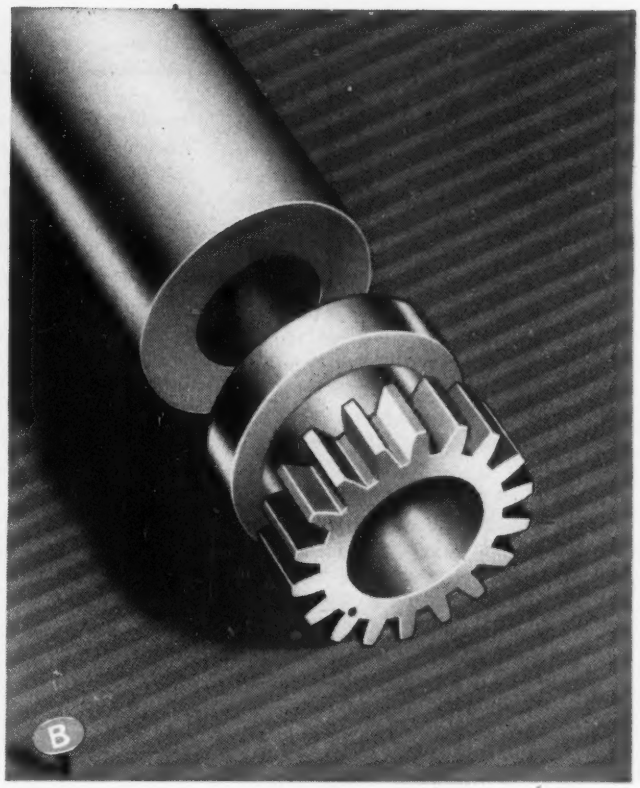
Fig. 4—Machine for welding into continuous strip hot rolled steel about to enter pickle tanks

Fig. 5—Delivery end of continuous pickle line equipped with dryer, shear, slitter, oiler and coiler

Fig. 6—New 5-stand strip mill which cold reduces 15-ton coil in about 5 minutes at maximum speed

Which of these parts costs less to make?





WHEN you make cylindrical parts from Timken tubing, you eliminate drilling entirely. There's less stock to machine, less scrap. Finish boring is often your first production step. Parts cost less to make.

Chances are you will also get added strength for your product due to the *uniform, fine forged quality* of Timken seamless tubing. The piercing process by which Timken tubing is made is basically a forging operation. This gives the tubing a *uniform spiral grain flow* for greater product strength and a *refined grain structure* which brings out the best in the quality of the metal.

Every inch of a Timken seamless tube possesses uniform fine forged quality because it is pierced at the rate of a foot a second with no time for heat loss! And Timken's rigid quality control from melt shop through final tube inspection assures you of a uniformity from tube to tube and heat to heat that means uniform response to your machining and heat treating operations.

It's more than likely that Timken tubing can help you make a better product at lower cost. Why not let our Technical Staff help you find out? They will make an "on-the-job" analysis of your problem without obligation. Just write our Steel and Tube Division, The Timken Roller Bearing Company, Canton 6, Ohio.

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Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing.

work rolls and backup rolls and generates great quantities of steam around the mill. In order to control and clear this situation, a fog elimination system was devised and installed which sucks the steam laden air away through a tunnel along the length of the mill, subjects it to condensing sprays in this subterranean duct and then discharges the air and residual water vapor to the atmosphere through two 80,000 cubic feet per minute suction fan driven by 125-horsepower motors.

Another feature of cleanliness, as well as of modern reclamation, is doing away with conventional troughs under the mill for separating the palm oil used for rolling lubricant on the mill from the cooling water. Instead, the moisture is pumped as fast as it accumulates beneath the mill to an independent separation plant at high level in another building.

Thickness of the strip as delivered from the last stand is measured by a gage which bombards the thin metal with a beam of x-rays. Simultaneously, a second beam from the same source continuously penetrates a standard reference sample of steel of the same thickness.

A radiation detector then measures and compares intensities of the two beams after they have been transmitted through their respective targets. If intensities are the same, the steel is of the desired thickness; if not, it is indicated to be either less or more than the desired thickness. The gage is a development of the General Electric Co.

Jones & Laughlin Steel Corp. was among the first of the fully-integrated independent steel companies to engage in the manufacture of tin plate. This was in 1910. In the 1930's, the traditional hot rolling of sheets for tinning in packs on 2-high jump mills was abandoned for the newly developed cold reduction of hot rolled strip in powerful 4-high strip mills. The company's 32 hot mills that had supplied tin plate for millions of base boxes of tin plate were either junked or disposed of to aluminum industry.

Their job was picked up in part by a 4-high reversing cold reducing strip mill at Aliquippa tin mill and mainly by a 54-inch 4-stand mill at the Pittsburgh Works, strip and sheet department. The latter is a combination mill for rolling strip to either the lighter tin plate gages or for sheet gages, which are heavier.

Slabs of steel for tin plate are converted to hot rolled strip on the 96-inch hot strip mill at the Pittsburgh Works. Here in the past they have been pickled in a continuous hot strip mill pickler and either coated with a rust inhibiting oil for shipment to Aliquippa for cold reduction on the 4-high reversing mill, or coated with palm oil for cold reduction on the 54 inch 4-stand tandem mill at Pittsburgh. Product from the latter mill was shipped to Aliquippa for further processing along with coils from the Aliquippa reversing mill through annealing, tempering, electrolytic or hot dipped tinning operations, packaging and shipment. Electrolytic tinned plate is sheared after tinning and hot dipped before tinning.

DATA ON MILL MOTORS

Stand No.	Motor H.P.	Motor R.p.m.	Ratio drives	Speed, r.p.m
1	1750	80/240	1/1	450/1351
2	3500	150/360	1/1	844/2026
3	3500	175/350	1/1.525	1502/3004
4	3500	200/400	1/2	2251/4503
5	4000	275/535	1/2	3096/6023
Del. reel	600			

Shipment of coils after pickling and before cold reducing or after cold reducing and before electrocleaning constitutes a break in the cold reduced strip processing cycle which is unfavorable from both a processing and a cost standpoint and, in 1945, officials of the company again authorized a major change and costly investment. This involved the abandonment of pickling coils for tin plate at the Pittsburgh strip and sheet department, also the rolling of them on the Aliquippa reversing mill and the Pittsburgh 4-stand tandem mill.

In the future coils for tin plate from the Pittsburgh Works' 96-inch hot strip mill will be carefully cooled on a new hot coil conveyor about 800 feet long before shipment in the hot rolled condition to Aliquippa. This conveyor is to be installed at a cost in excess of $1,000,000 and is designed to prevent edge or other damage to the hot coils coming from the mill or baked-in scale while bringing the steel down to a satisfactory handling and shipping temperature.

The old hot mill group of buildings at the Aliquippa tin plate department has been revamped with many additions and the ultra-modern 42-inch 5-stand tandem cold strip mill previously described.

The new pickling line and mill, designed and built by the Mesta Machine Co., Pittsburgh, have adequate capacity not only to fully serve the present cold strip finishing and tinning department, but also capacity to take care of a considerable future expansion of those departments. The pickler has a rated capacity of 50,000 net tons per month of pickled coils and the mill a rated capacity of 40,000 net tons of cold reduced coils per month.

The 42-inch continuous pickler is located just ahead of the mill and delivers coils of clean pickled strip adjacent to the entry of the mill. Units have been made of rugged construction for operation at high speeds and extreme service. Design is on the basis of pickling at a speed in excess of 400 feet per minute to meet the ultimate rated capacity of 50,000 net tons per month. Ward Leonard electrical control is used throughout.

The 6000 or 7000-pound coils are conveyed into the pickler and the 30,000-pound coils away from the pickler on heavy pallet-type conveyors with the coils always on their round sides to prevent any damage to the edges of the strip. Each coil is weighed automatically without having to leave the conveyor.

Strip is fed from an expanding mandrel-type feed reel into the especially rugged processor and without the use of edge damaging side guides. The reel has two sets of breaker rolls and is operated hydraulically.

Coil ends from the crop shear are disposed of by a convenient scrap handling car arrangement.

Coils are welded together by an electric flash welder of new design and powerful construction. This welder has hydraulic feed and push-up and electronic heat control.

The four pickling tanks, equipped with ducking rolls, are each 80 feet long. Their 10-inch brick linings are set in special high temperature resinous cement, good for temperatures up to 250 degrees Fahr. The tanks are served by a high capacity fume duct system. The pickled strip leaving the rinse tank goes through a high capacity dryer to insure against any wet patches on strip as coiled.

Edges of the strip are slit, if desired. Strip is delivered in coils up to 30,000 pounds, coated with palm oil and ready for processing through the 42-inch high-speed tandem mill with a maximum uniformity of smooth operation.

Fabrication Affects Magnetic Materials

Chief factor in the fabrication of magnetic materials is handling them without negatively affecting the electrical characteristics of the metal, stated J. E. Ryan, General Electric Co., Schenectady, N. Y., at a recent meeting of the Northern New Jersey American Society of Tool Engineers. Low carbon steels as well as other steels are adversely affected by bending. Because the cross section is reduced at the bend, the flux density is raised and the magnetizing current requirements are increased. Thinning of the section can only be avoided by allowing for a large enough bend radius.

Oil Coolant Mist

(*Concluded from Page 87*)

The conditions under which the plants operate vary considerably. Those in the North have different winter problems than those in the South. In addition to varying plant conditions there is a wide diversity of types and designs in the high-speed thread grinders requiring application of oil-mist and smoke - eradicating equipment. Not only do the designs of different manufacturers for a machine for a given duty differ but also machines for different operations vary substantially in size and shape although they have been designed and built by the same maker.

To encompass these diversities an essentially fundamental unit is required; one that can be adapted to the location and style peculiar to the high-speed mist-creating machine involved by merely designing a proper pick-up connected to the intake of the precipitator. The unit can be either floor mounted or suspended alongside or above the machine it serves. Coolant oil collected is returned from a pipe connection in the unit to a filtering sump alongside the machine tool, Fig. 3, or to a central coolant-filtering location where it is cleaned and piped again to the machines.

Fig. 3 shows an installation of the electrostatic air cleaner at Wolverine Brass Works, Grand Rapids, Mich. The carefully designed hood for the screw machine operating head is built as air-tight as possible to allow proper air flow. Ducts are inclined, permitting condensed oil particles to drain into the circulating tank.

Stresses Optimum Conditions for Economy and High Production

DR. Karl L. Fetters, special metallurgical engineer, Youngstown Sheet & Tube Co., Youngstown O., in speaking on "Slag Control in the Economics of Steel Production" before the Pittsburgh chapter, American Society for Metals, on Jan. 8, presented a summary of the chemistry, mineralogy, control, and operating significance of basic open-hearth slags.

Tonnage of iron per blast furnace per day, he stated, has decreased from 850 to 700 tons during the past two years. This has been brought about by an increase in ash content of the fuel and a concomitant decrease in quality. Moreover, the density of scrap has decreased appreciably over a period of years, as follows:

Year	Lb. scrap/buggy	No. buggies
1943	11,700	....
1944	11,664	18.9
1945	10,403	....
1946	8,896	....
1947	8,896	24.9

The speaker mentioned that good slag control is paramount in economical open-hearth operation. The most important problem is the reduction of sulphur.

A layer of slag covers the molten metal, and the ingoing heat must penetrate this layer. Without good control a low slag volume is impossible to obtain. Savings in heat time and an increase in the *R* value (tons per hour divided by total tonnage per heat) can be achieved by proper slag control. This was shown statistically for Plants A and B of Youngstown Sheet & Tube Co. Good control decreases the amount of limestone necessary.

Dr. Fetters in considering the basicity of the slag as a function of the amount of lime in solution, mentioned that the amounts of fluxing agent are important in controlling the degree of basicity. An increase of the basicity by increasing the slag volume reduces the production rate of the open-hearth furnace.

About 2 per cent slag is used on electric furnace heats and about 10 per cent for open-hearth operation.

The speaker then discussed the affect of slag on sulphur removal and pointed out that the higher the slag volume the lower the sulphur content will be. It is common practice to charge a deficiency of lime and make corrections later.

Slags can be classified by type and "maturity" (degree of solution). The major constituents of a basic slag are CaO, SiO_2, MnO, MgO and FeO. P_2O_5 may be present.

The speaker illustrated the usefulness of temperature-composition diagrams by explaining the ternary SiO_2-CoO-FeO system. Its mineral constituents are Cristobalite, Tridymite, Wollastonite and Fayalite. Optical properties of these phases are rather difficult to obtain. In the study of slags it is important to know:

a. The general types of phases present.

b. The degree of solution of the phases in the slag.

Dr. Fetters explained the lime/silicon ratio, known as *V* which is:

$$\frac{CaO}{SiO_2+P_2O_5}$$

Some slags contain only a single phase, some two, others three. Acid slags, whose *V* ratio is less than 1.6, are typical of premelt or early melt slags. There is no evidence of phases which have not been in solution. The silicate phase predominates. The minerals are readily recognized under polarized light. Early slags are often high in FeO; however, their oxidation coefficient is not high. In some slags FeO and MnO (weak basic oxides) can be replaced by lime.

When the *V* ratio exceeds 1.6, dicalcium silicate begins to form and undissolved phases start to appear. As the *V* ratio approaches 2.0, the solubility is much decreased unless the temperature is high. Judicious use of fluorspar aids in obtaining solution of the undissolved constituents. The *V* ratio will be slightly in excess of 2.0 for typical finishing slags. Dicalcium silicate, Wustite and calcium ferrite are the major constituents.

As the basicity increase, tricalcium silicate exists instead of dicalcium silicate. As would be expected, larger grains of the slag form as the rate of cooling decreases. Electric furnace slags seem to crystallize with larger grain size than open-hearth slags, according to Dr. Fetters.

Periclase (MgO) exists in the silicate phase of the late slag. It is hard to observe.

Dr. Fetters touched upon the oxidizing power of slags and mentioned that the rate of oxygen transfer may vary over wide limits, and that the rates at which equilibrium conditions are reached are fast. As the FeO in the furnace charge varies the FeO content of the slag will also vary. It was pointed out that the practice of bubbling oxygen through the bath (direct oxidation) has passed the experimental stage but does not make slag control unnecessary.

Experiments are now being carried out to take the burden of sulphur elimination from both the blast furnace operator and the open-hearth shop by eliminating sulphur while the metal is in transfer.

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BAR & TUBE TURNERS

For speed...and for precision! Continuous, automatic feeding gives you high production unequalled by any other type of turning machine! For both rough peeling and finished precision conditioning, Medart Centerless Bar Turners will turn bars and tubes at maximum rate obtainable from any present day cutting tools. The machines are very flexible. May be used with one or two cutterheads, with one or up to eighteen tools in each head.

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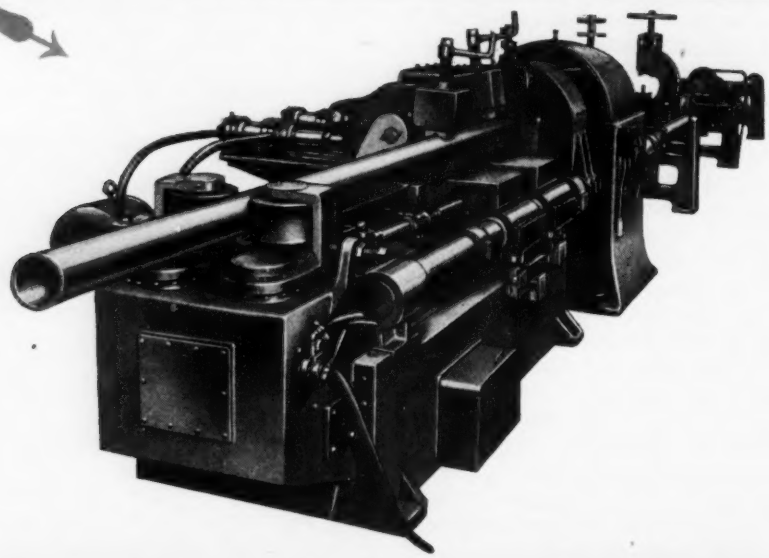

MANUFACTURING ENGINEERS OF COMPLETE TRANSMISSION EQUIPMENT AND SPECIALIZED MACHINERY

MEDART

THE MEDART COMPANY • 3500 DE KALB ST., ST. LOUIS, MO.

Powdered Metals

(*Concluded from Page 90*)

In connection with those differences it is interesting to compare the average openings of the several sieves as measured during the certification tests. Differences between sieves are found to be considerably less than they would be if the comparison were made on the basis of the nominal opening. The agreement probably would be even closer if the variations in sieve openings could be taken into consideration. Due to manufacturing limitations the dimension tolerances of wire cloth permitted by specification are necessarily rather wide, particularly for fine sieves. These variations are not fully reflected by the measurement of the average opening.

Further investigations of possible methods of eliminating, controlling, or evaluating the effects of these and other variables encountered in sieve analyses of metal powders are being studied at the National Bureau of Standards.

Rectifying Salt Bath Adds To Electrode, Pot Life

Rectifying salt baths used in heat treatment of high speed steels are the subject of a new four-page folder by E. F. Houghton & Co., Philadelphia. Self-rectifying salts are said to be unnecessary as the same results can be obtained through the use of an inexpensive carbon rod immersed in Houghton's Liquid Heat 1550.

Advantages of this salt, when used with the carbon rod, include longer electrode and pot life; increased fluidity of the bath, with less drag-out and subsequently less make-up required; greater stability of the quench bath due to reduced carry-over of heating salts; better circulation in the bath, with savings in heating costs; and rectification that is entirely automatic.

—o—

Government owned inventions suitable for patent protection in foreign countries were released recently by the Office of Technical Services, Department of Commerce, Washington. A total of 65 inventions including some in fields of machinery, metals, electricity, and plastics are embodied in the list. Government-owned patents are made available to American industry on a royalty free, nonexclusive licensing basis. Expenses of filing foreign patent applications covering these inventions must be borne by private firms and associations.

duction of fabricated metal products, namely, Wisconsin, Indiana, Ohio, Illinois, New Jersey, Pennsylvania, New York, Massachusetts, Connecticut, Michigan and California. Of these 11 states, over 65 per cent of the activity is in 6 states: Michigan, Ohio, Illinois, New York, Pennsylvania and New Jersey.

With this information, our sales department set out to investigate the industrial activity within each of these states and their major cities. This investigation consisted of research in libraries, the chambers of commerce, manufacturing associations, newspapers and publishers in Cleveland, Detroit, Chicago, Minneapolis, St. Louis, Indianapolis, Philadelphia, Newark, New York and Boston.

We found that large gains in industrial activity had been made in all of these cities; further that wartime levels would be reached in either 1948 or 1949. New factories were being built and many manufacturers were expanding. The metalworking industry was growing and we must grow with it!

The number of wage earners in industry was increasing, the value of products had increased and industrial buying power was gaining. The data gathered assured our executives that the above mentioned key industrial cities were our principal domestic markets.

C—Determining the Market Indicator—Publishing of market data during the war had been curtailed because of restrictions and abnormal and accelerated changes. Completion of data would be out of date almost before it could be placed in effective use. Selection of a suitable market indicator proved to be one of our most difficult problems.

In the establishment of an industrial market indicator for geographical areas it is necessary to consider and combine secondary governing factors with the primary factor after the appropriate weighing of facts gathered by research. The secondary governing factors to be considered and combined with the primary factor are: The general shifts and location of the population; the wages in areas to calculate the buying power per capita; the use of sales results in one area which has shown better than average results in past sales performance; the use of county data when available such as economic and industrial conditions; the length of time our large die feeds have been on the market; contact lists of dealers and our own prospect list. Each type of vital statistics is helpful in making the market analysis and determining the indicator.

However, our gathering of statistics and research proved its worth when our staff made its initial visit to the Penton Publishing Co., Cleveland, publisher of STEEL, for they had recently completed an extensive census of the metalworking industries and had broken it down into many categories, showing the number and size of plants of particular industries by states. This information became the primary governing factor in the establishment of the market indicator. The census made by STEEL provided a most accurate market indicator. (See Fig. 2)

We now had located the markets and set the primary factor (census of plants performing stamping, forming and drawing operations) or the market indicator by which the potential use is to measure (1) efficient sales operation by territories; (2) efficient advertising effort by products and territories and (3) sales costs by territories.

D—Choosing The "Domestic Sales" Distributor—In selecting distributors, it was necessary to find men or organizations not only with detailed knowledge of feeding mechanisms but also actively associated or specializing in a related machine tool line. The line most closely associated to our products is of course die sets themselves. Of secondary importance, are agencies handling punch presses.

We wanted and got distributors who were aggressive, willing to learn in every detail the features of our equipment, and in turn, sell these features. The salesmen of these distributor organizations were required to have qualified engineering experience in order to show prospective buyers and users why they should invest in the product and what the ultimate value would be in manufacturing cost reduction, improvement in quality and increased production.

It was a coincidence but also important that we found the greatest percentage of our selected distributors were members of the American Machine Tool Distributors Association, which already had accepted standard territorial allotments for specific areas. The map, Fig. 1, shows our territorial arrangement which, for the most part, follows the boundaries outlined by the American Machine Tool Distributors Association. These distributors, of course, have salesmen already well established in these territories that were selected.

E—Choosing the Distributor—Foreign Sales—It largely depends upon the sales and marketing intentions of a company whether its own export department is justified. If it intends to manufacture an industrial product for considerable export volume and also to resell in the domestic market, the generally accepted ratio of manufactured products is 60 per cent export and 40 per cent domestic. It takes any manufacturer a goodly length of time to build up a 60 per cent export volume.

In our own case, we definitely knew our product could be sold in greater volume in the foreign market. However, in view of the fact that we are concentrating our efforts currently on domestic sales, it would be to our gain and at a greatly reduced cost to turn our product over to organized exporters and, naturally enough, to those having a well organized engineering department.

We decided to appoint one special exporter to handle South America exclusively and another to sell in all other countries with the exception of the United Kingdom and its Dominions. We made a contract with a Canadian firm to manufacture our products in Canada on a royalty basis with a Canadian machine tool exporter handling sales in the United Kingdom and the other Dominions. An exclusive distributor handles Canadian sales.

This setup makes it possible to reach the United Kingdom and its dominions at greatly reduced cost since Canada enjoys a preference over America in the exportation of industrial products. Canada also can accept payments for industrial products in American dollars, Canadian dollars and sterling, while the American exporter must have American dollars for his product. This is advantageous because the number of American dollars available in the various Dominions today is far from plentiful and therefore, the future is not bright.

F — Establishing Territories and Quotas — Assignment of territories was relatively simple inasmuch as most of the distributors selected were members of the American Machine Tool Distributors Association, and had well established territories which did not conflict with those of fellow members (Fig. 1).

However, the establishment of quotas for each territory offered a challenge to our ingenuity. We had our market indicator and a sales record showing the total monthly sales

When the job calls f

ls for a *ringmaster...*

call on
STANDARD STEEL

Whenever you have a job that calls for a weldless ring . . . you'll find unusual experience and unusual facilities ready to serve you at Standard Steel Works. Third-generation descendants of old-world craftsmen who came to Standard three-quarters of a century ago are numbered among the "ringmasters" whose skill and knowledge put extra quality, extra dependability and extra satisfaction into every job.

DESIGN AND PURCHASING DEPARTMENTS—Practically all sizes of weldless steel rings—tires and other miscellaneous products of circular form—up to 12-feet in diameter are regularly produced in Standard Steel Works shops. Facilities include three tire-mill units, each served by two steam hammers for the preliminary operations. Quality control covering every step in production, from initial melt to final operations, assures rigid adherence to specifications. May we quote on your requirements?

BLW THE BALDWIN GROUP

BALDWIN

STANDARD STEEL WORKS DIVISION

The Baldwin Locomotive Works, Standard Steel Works Division, Burnham, Pa., U. S. A. Offices: Birmingham, Boston, Chicago, Cleveland, Houston, New York, Philadelphia, Pittsburgh, San Francisco, Seattle, St. Louis, Washington.

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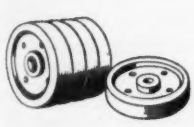
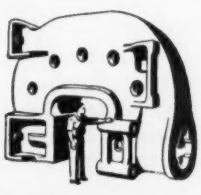


WHEEL MILL PRODUCTS



STEEL CASTINGS

WELDLESS RINGS

FORGINGS

in each of the states or group of states in Fig. 2.

Comparing past sales records with the potentials shown on the market indicator, it was found that the figure for Illinois was very comparable to the record. Therefore, the Chicago distributor was selected as a basis for establishing the quotas of other states and territories in direct ratio.

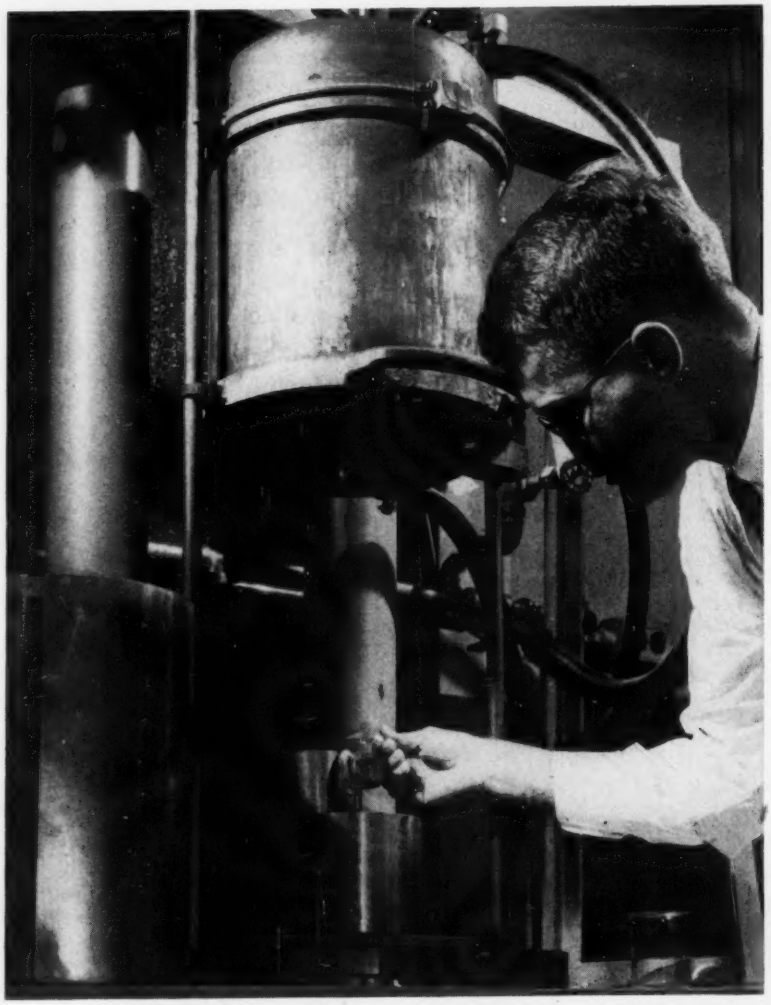
Referring to the market indicator, we found the greatest potentials in our field to be in Illinois, New York and Ohio. The Ohio territory was not subidivided as were New York and Illinois. There were justifiable reasons. The distributor selected had a branch office in highly industrialized Dayton area which covered the balance of the state very adequately. In New York, our investigation disclosed that machine tool distributors confined their activities to smaller areas. The Chicago distributor had been covering Illinois with satisfactory results for a number of years and it was our decision not to disturb this arrangement.

Obviously, we were faced with another problem of how we were to establish equitable quotas for the four subdivisions into which we had divided the state of New York, where the only figures available on sales potential were for the entire state. Here, statistical information obtained by visiting various organizations, such as the chambers of commerce, libraries, manufacturers associations, local newspapers, etc., proved invaluable. Therefore, it was only a matter of correlating this statistical information with past sales records.

An additional bonus quota was arranged whereby the distributor could obtain an extra discount on sales in excess of basic monthly quotas. This arrangement proved more than satisfactory to the distributors since it permitted them to allow additional incentive commissions to salesmen.

G — Advertising and Market Research—The proper approach to industrial advertising is through the results obtained from intelligent market research. It is necessary to not only know the attitude of customers and prospects but to determine reasons for buying.

Eighteen months of comprehensive survey showed that over 70 per cent of our prospective buyers would purchase equipment of this type provided we could show a manufacturing cost reduction anywhere from 14 to 35 per cent. Dickerman advertising policy now is based upon this factor as well as increased production and improvement in quality.



RESEARCH "PRESSURE COOKER": Temperature of 4700° F for melting and fusing electronic tube materials is sought in this custom built furnace at Westinghouse Lamp Research Laboratories, Bloomfield, N. J. Tiny tungsten crucible filled with powdered materials is heated under high pressure by passing high frequency current through tungsten encircling the Lilliputian-like ladle. Tungsten is being used because its melting pointed is above the 4700° F desired

Wet Belt Machining Cuts Production Costs

Production was raised from 43 pieces to 167 pieces per hour by use of a wet belt machining method developed by the Porter-Cable Machine Co., Syracuse, N. Y.

Problem was to remove 1/16 to 1/8-inch stock from a 1 1/2-inch surface on a cast aluminum gear housing. In addition to the high production costs using the old method, loading and unloading time accounted for considerable unproductive labor costs.

In the new method, jig for holding parts is greatly simplified. It consists merely of a pin that fits into the bearing hole of the gear housing to hold the work against the belt. Setup time for this jig is 10 minutes.

After placing the gear housing on the pin, it is pushed against the abrasive belt and the required amount of stock is removed in a few seconds to close tolerance.

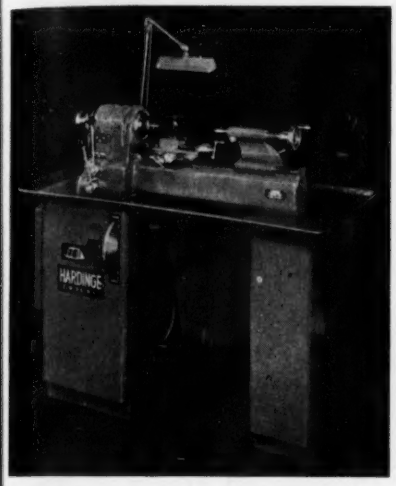
Up-to-the-minute machine tools, methods and materials have been adopted in the entire manufacturing process in the long range modernization plan of Binks Mfg. Co., Chicago. Outcome of the plan, begun at the end of the war, is that the company states that immediate delivery is possible on almost all standard spray finishing equipment. Included in this delivery schedule are spray guns, oil and water extractors, portable spray painting outfits and similar equipment and accessories.

New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 134

1. Variable Speed Lathe

Variable speed drive and free spindle clutch are features of the new high speed precision lathe, designed for working to close tolerances and finished specifications in tool rooms, laboratories and development departments by Hardinge Brothers Inc., Elmira, N. Y. The hardened and ground steel bed ways are of improved dovetail design, forming a



solid bed top. Lathe bed has a three-point mounting on the welded steel base.

Fully enclosed headstock has a preloaded ball bearing spindle, ground to take 1-inch capacity 5C Hardinge collets and 6-inch capacity step chucks. Spindle nose has standard Hardinge threaded nose for direct application of step chuck closers, jaw chucks and face plates. Left side of base contains variable speed driving unit and motor. Spindle speeds from 90 to 3500 revolutions per minute are possible.

2. Production Aids

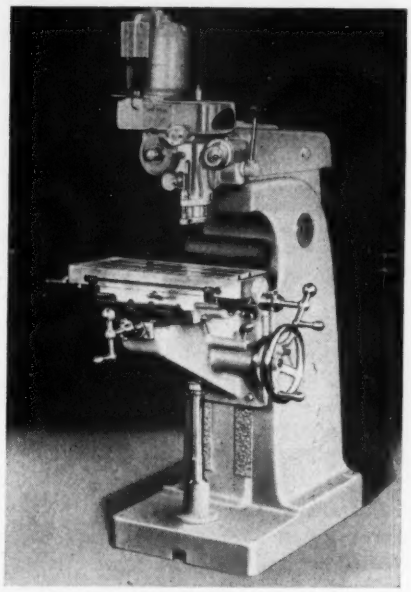
Northwestern Tool & Engineering Co., 117 Hollier Ave., Dayton 3, O., is announcing three new or improved tool room and production aids—set-up stud sets, jig and fixture parts and adjustable step blocks. Stud sets are offered with a selection of T-nuts for 7/16, 1/2, 9/16, 5/8, 11/16, 3/4, 13/16 and 7/8-inch table slotted machines. Each set consists of six T-nuts, four coupling nuts and four studs of 3, 4, 5, 6, 7 and 8-inch lengths. Coupling nuts make possible lengths up to 15 inches.

Step blocks for reducing setup time and protecting table surfaces on punch presses, milling machines, jig borers, plotters, etc., are manufactured in graduated 1/16-inch steps in either hard maple or cyanided steel. Individual blocks are available in capacities of 3/4 to 1-1/2, 1-1/8 to 2-1/2 and 2-1/2 to 6 inches. Two-inch double duty blocks also are made.

Jig and fixture parts, consisting of knurled head screws, shoulder screws, press type jig feet and rest pads, screw type jig feet and rest pads and other items also are available from the company.

3. Milling Machine

A ram type, hand feed vertical milling machine, offered by George Gorton Machine Co., Racine, Wis., is available with either swivel head or universal head, making it adaptable to a wider range of work. Convenient



to operate because it is proportioned to permit the operator to sit at the machine, the machine has an adjustable ram, heavy column, sensitive table and saddle movements and quickly adjustable head. It may be specially equipped for general engraving and brass routing and for die and mold duplicating.

Features include an instant-stop spindle brake, a spindle lock, a screw type spindle depth stop and quick-action belt tension adjustment. Antifriction bearings in head spindle are permanently lubricated. A 1/2 horsepower, high torque, reversible motor provides six spindle speeds from 300 to 5000 revolutions per minute. Higher speeds are available.

4. Fork Lift Truck

Engineered for crowded operating conditions, both vertical and horizontal, a new fork lift truck, the Skylift Shipper, designed by Automatic

Transportation Co., 149 West 87th St., Chicago 20, Ill., will operate in motor truck and trailer bodies, in crowded aisles and through low doors. It has a collapsed height of 68 inches and is capable of handling 2000 pounds up to 48-inch loads.

Maximum lift is 108 inches. The truck also incorporates the Newmatic controller which acts as the electric counterpart of an automotive automatic gear shift, silicone insulation and lubrication of the electrical system, eliminating danger from overheating.

5. Projection Welder

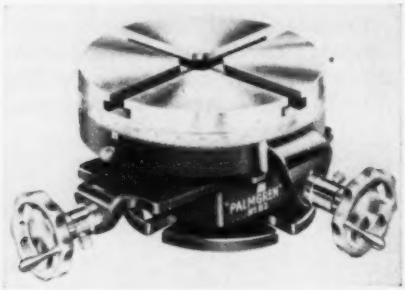
Installation of a roller antifriction head and the extension of the antifriction features to include bellows air lock and bearings for cam follow-up and drive box are improvements in the type ENB motor driven press type spot and projection welder announced by Taylor-Winfield Corp., Warren, O. Cam is designed to provide a maximum welding force at maximum spots per minute with minimum loading of drive unit.

Up to 200 strokes per minute may be had with no alteration other than

changing cams, pulley ratios within the range of 1/2 to 2-inch strokes. Transformer is of damage resisting type connected to tap switches without flexing primary leads. Maximum rigidity is assured by use of composite copper-steel knee construction plus a rugged frame and head support.

6. Indexing Table

With a table top graduated for the full 360 degrees and which can be rotated manually or locked in any desired position, the new Palmgren No. 82 indexing and cross slide table has



four bolt and key slots for rigid mounting to the table of the milling machine, drill press, shaper or surface grinder. As made by Chicago Tool & Engineering Co., Chicago 17, Ill., the table diameter is 8 inches and parts and fixtures may be bolts in T-slots.

Cross travel is by feed screws and is calibrated in 0.001-inch. Adjustable gibs are for take-up due to wear. Maximum travel is 4 inches. Table is manufactured of semisteel castings, bronze and steel.

7. Electric Air Valve

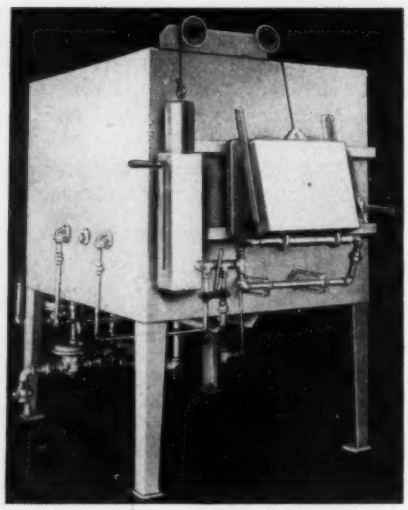
Fast acting pushbutton control for small, air operated presses and similar units may be provided by a new electrically operated 4-way valve for directional control of the flow of com-

pressed air, manufactured by Hannifin Corp., 1101 South Kilbourn Ave., Chicago 24, Ill. It may also be used as an automatic control for any air operated unit through the use of limit switches or mechanical stops.

Of packless reciprocating disk type, pilot operated and solenoid controlled, the valve has an aluminum piston and hardened stainless steel disk. It is made in two types, with two solenoids controlling valve position or with one solenoid which returns to original position when de-energized. More than 180 operating cycles per minute are possible with air pressure from 25 to 150 pounds per square inch. Standard models are built for 115 volt, 50-60 cycle circuits.

8. Electric Furnace

Toolrooms may be well served by the new 1100-2500°F range high speed electric furnace featuring close temperature control and even heat distri-



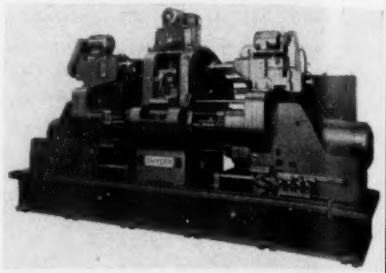
bution, manufactured by Sunbeam Corp., Chicago, Ill. Vertical mounting of nonmetallic elements and a lining of insulating refractory materials make these features possible. Vertical element mounting gives longer life as there is no sag in operation.

Low heat storage insulating refractory lining allows the furnace to be brought up to temperature rapidly. Tightly sealed door is operated by a foot-operated air hoist or it may be operated manually. Furnaces of the following sizes (in inches) are available: 6 x 12 x 18; 9 x 15 x 24; and 12 x 18 x 24.

9. Six-Operation Machine

A special purpose, automatic two-way hydraulic feed machine which drills, reams, countersinks, spotfaces, bores and tap holes in both ends of hydraulic lift cylinder blocks is announced by Snyder Tool & Engineering Co., Detroit, Mich. It has eight work stations with eight trunion-mounted work holding fixtures in which the work piece is clamped manually. An electrically operated automatic Geneva index routes the work through successive operations.

Mounted opposed are two master driveheads from which power is trans-



mitted to individual auxiliary heads at each station. Auxiliary heads carry individual bushing plates to maintain accuracy in the work. Master drive heads are equipped with rapid-advance tapping heads with individual lead screw tapping spindles which feed the tap into and out of the work. Tools are high speed steel and carbide. Drill speeds are 80 feet per minute and reamers, 45 feet per minute.

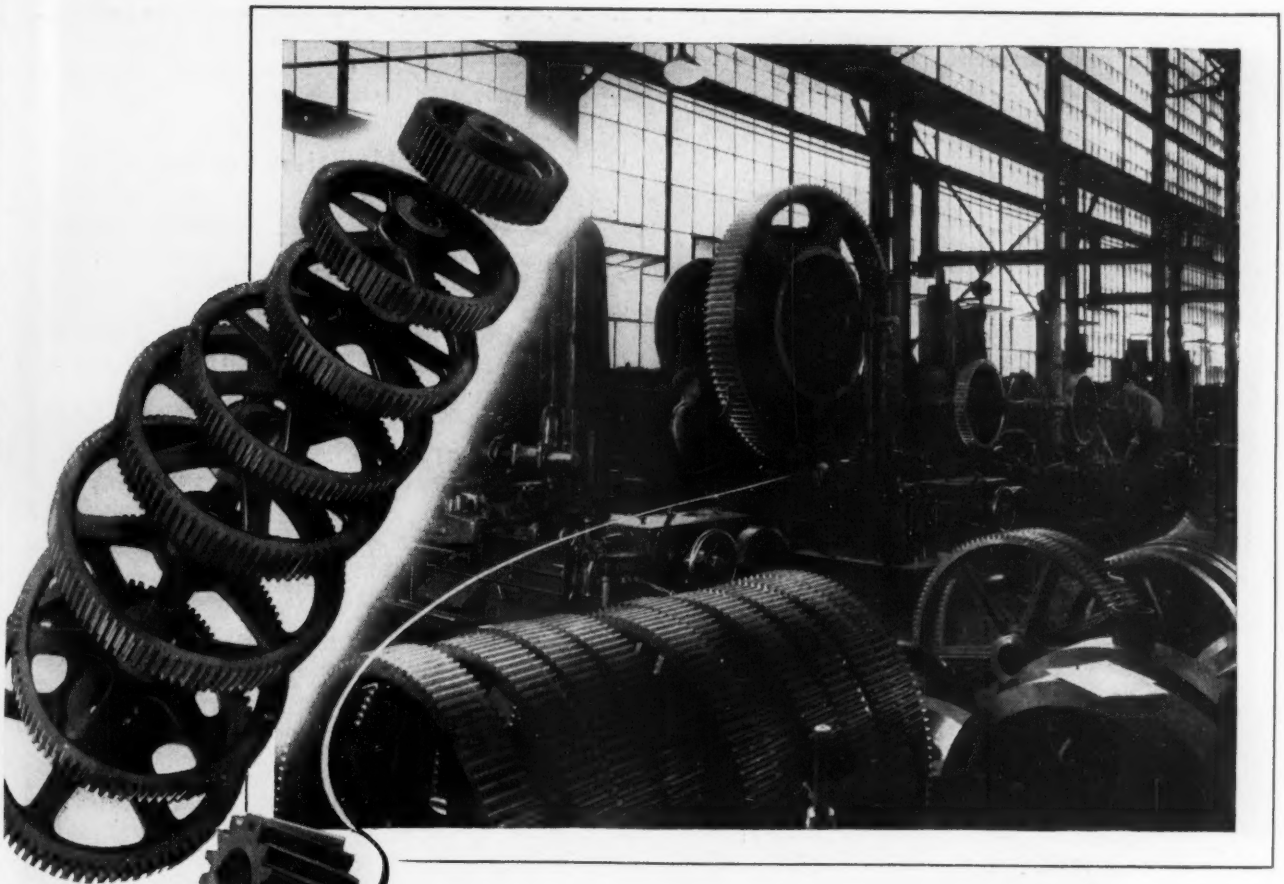
10. Fork Lift Trucks

Features of the Ford-powered Motowlift fork lift trucks, made by Service Caster & Truck Corp., Albion, Mich., are all controls and full-vision

instrument cluster incorporated in the steering column, a single lever controlling all hydraulic operations, design of seat frame and floor providing easy accessibility for maintenance and inclosure of mast to mechanism to exclude foreign matter.

Three and four thousand pound solid rubber tired models in 108 and 144 inch lifts are being made, alon

(For more information, use the card following page 134.)



GEARS

of Neloy (OR NELOY MOLY)

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(NE) is the symbol of quality recognized by users of industrial gears everywhere. Our Foundries specialize in Gear Blank Castings of Alloy and Carbon Steel. The facilities of the National-Erie Corporation at your command, permit complete control from raw material to the finish machined gears. Spur, bevel and Sykes Herringbone of Neloy (or Neloy Moly) meet with outstanding success in industry because they are giving excellent service in many varied applications.

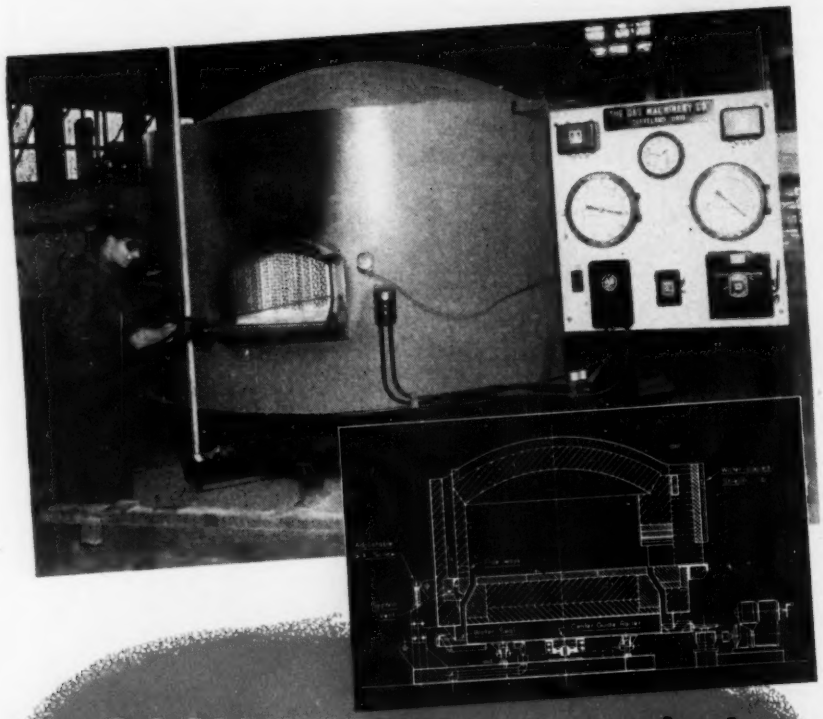
First and final costs of Neloy (or Neloy Moly) gears are reasonable. The (NE) Flame Hardening Process combines the high surface hardness of carburized or case hardened treatment, combined with the toughness of a fully quenched medium carbon alloy steel.

Neloy (or Neloy Moly) is the Ideal alloy steel for gears . . . the Preference of Industry. Let us help you meet your gear requirements.

Write for bulletin No. 7.

NATIONAL ERIE CORPORATION

ERIE, PENNSYLVANIA • U. S. A.



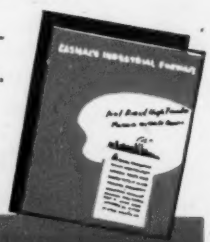
GASMACO Water Sealed
Rotary Hearth Furnace
with Special Syphon Vents
FOR FORGING, ANNEALING
and HEAT TREATING

This is one of a complete line of Rotary Hearth Furnaces built in various types and engineered for specific applications of forging, annealing, heat treating, tempering and clean heat treating.

Each furnace is carefully designed to require the least possible operating labor and to reduce maintenance costs.

The floating hearth plates (patent applied for) prevent warpage and maintain a uniform load on each roller. Another and very important feature is the water sealed hearth using patented syphon vents (illustrated in drawing above) to short circuit any water vapor, formed above seal, directly to the flue ways.

It will pay you to investigate these outstanding furnaces. Let's talk over your heat treating problems.



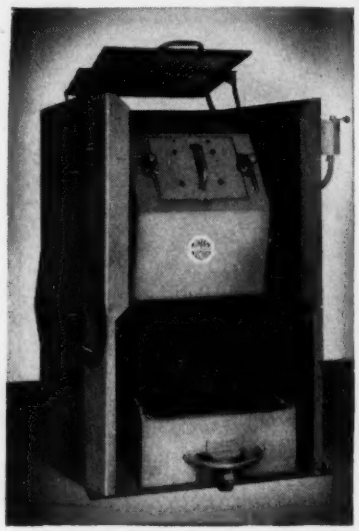
WRITE FOR FOLDER A-100

THE GAS MACHINERY COMPANY
16116 Waterloo Road • Cleveland 10, Ohio

with pneumatic tired models. Accessories include air expanding forks, scoops, rams, cranes and special forks.

11. Rotary Finisher

Processing of small parts using the Roto-Finish grinding, deburring, Britehoning or coloring process is possible with the one compartment model CW-22-1 Roto-Finish machine, announced by Sturgis Products Co., Sturgis, Mich. The one compartment



cylinder with an inside diameter of 19 x 32 inches is lined with replaceable kiln dried maple and equipped with a full size, light weight door with molded rubber gaskets and held in place by cam locks.

Standard equipment includes a forward and reversing switch with synchronized magnetic brake to facilitate loading and unloading, a control valve for adding water, a 1-1/2 horsepower, 220-440 volt, 60-cycle, 3-phase motor with gear reducer and a swivel type, 3-point suspension hoist pan.

12. Packaged Welder

All automatic welding needs—welding heat, control equipment, welding transformer and work positioning equipment—is offered in a packaged unit by Westinghouse Electric Corp., Pittsburgh 30, Pa. Standard Weldomatic heat, for welding with alternating or direct current, operates with a capacity of 1200 amperes alternating current, with a special nozzle for 2000 amperes. Capacity for direct current welding is 800 amperes. Nozzles and knurled drive wire feed rolls are supplied, with wire feed automatic.

Motor generator set is driven by a 2 horsepower, 220/440 volt, 3-phase, 60 cycle, alternating current motor. A 2-pole constant-potential

There's A New Angle For Opening-Up Sales At Wolff Metal Service

REYNOLDS ALUMINUM Rolled Shapes

for structural work, fabrication and screw machine products.

Set your sights on production for 1948 . . . and look to Wolff Metal Service for the materials best qualified to handle the work you're called upon to do. Reynolds Aluminum shapes, for example, point to a better, easier way of handling many framing and supporting jobs with increased efficiency and economy. Similarly, Reynolds rod stock offers a brilliant new opportunity to cut costs substantially in the production of screw machine products . . . for this highly machinable metal can be worked with outstanding ease, speed and economy. Even more, its initial cost is only a fraction of the cost of other materials commonly used for screw machine products.

Investigate the applications of versatile Reynolds Aluminum. It offers not only a way out of metal shortages, but frequently enough the best of all ways to keep your production rolling. Full and detailed particulars are yours for the asking. Call Republic 9100 or write.

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18-8 stainless steels WITH A plus FOR YOU...

FOR 25 years or more steels with an alloy content of 18% chromium and 8% nickel have shown such remarkable resistance to corrosion that they have earned the name of "Stainless" steels.

Although basically the same, the modern, 1948 models of the "18 and 8" stainless steels have been given a lot of PLUS values by recent metallurgical experience.

The analysis of Lebanon's Circle Ⓛ 22XM (left) is a typical example. In addition to increases in the percentages of chromium and nickel, approximately 2.25% of molybdenum is added. It enhances the general corrosion resistance to many chemicals and is an important PLUS value to many manufacturers—perhaps to you.

If corrosion is one of your troubles, your metallurgists and design engineers should have a complete file of the new Lebanon Data Sheets describing these alloys. Write for them today.

LEBANON CIRCLE Ⓛ 22XM

NOMINAL ANALYSIS

Carbon Max.	0.07
Silicon	1.25
Manganese	0.75
Chromium	19.50
Nickel	10.00
Molybdenum	2.25

NOMINAL PHYSICAL PROPERTIES

Tensile Strength	82,000
Yield Point	42,000
Elongation in 2"—%	50
Brinell Hardness	160

LEBANON STEEL FOUNDRY • LEBANON, PA.
"In The Lebanon Valley"
ORIGINAL AMERICAN LICENSEE GEORGE FISCHER (SWISS CHAMOTTE) METHOD

LEBANON ALLOY AND STEEL Castings

CIRCLE L

generator supplies control current and a 2-pole variable voltage generator supplies current to the driving motor in the head. Control relays and contactors required in the operating circuit are mounted in the control panel. Work positioning equipment is supplied as needed for the job.

13. Magnetic Separator

An adjustable hand magnet of the permanent type has been introduced for the handling and separation of steel by Multifinish Mfg. Co., 2114 Monroe Ave., Detroit 7, Mich. Com-

pletely self-powered, the unit is operated with one hand and lifts up to 15 pounds. Its load is instantly released when a finger-tip lever is raised.

Within its moisture-proof aluminum and stainless steel case are two 4-inch alnico magnets which will not lose power regardless of kind or length of use. Dimensions are 3 x 5½ x 8 inches and weight is 3¾ pounds.

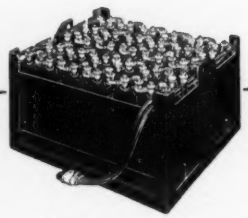
14. Wound-Rotor Motors

Line of improved totally enclosed, fan cooled, wound-rotor motors with tube type air to air heat exchanger, are announced by Allis-Chalmers Mfg. Co., Milwaukee, Wis. The greater efficiency of this exchanger permits a reduction in size. Motors are suitable for all industries, since they can be adapted to suit special requirements.

To assure trouble free operation under extremely unfavorable atmos-

POWER FOR TRUCKS THAT MUST WORK—

24 hours a day... EVERY DAY!



In Industrial Trucks,* EDISON *Nickel-Iron-Alkaline Batteries Give You These Important Advantages

They are **durable mechanically;** grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.

They can be **charged rapidly;** gassing cannot dislodge the active materials.

They **withstand temperature extremes;** are free from freezing hazard; are easily ventilated for rapid cooling.

They are **foolproof electrically;** are not injured by short circuiting, reverse charging or similar accidents.

They can **stand idle indefinitely** without injury. Merely discharge, shortcircuit, and store in a clean, dry place.

They are **simple and easy to maintain.**

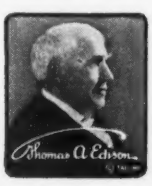
Illustrated above is a material-handling job for which trucks must be kept on duty 24 hours a day, every working day. It is the kind of job in which battery industrial trucks excel because of their dependability and economy.

With batteries exchanged two or three times a day, the truck is kept continuously supplied with power. While one battery is being charged, another operates the truck.

IDEAL POWER CHARACTERISTICS

The truck starts instantly, accelerates smoothly; operates quietly; gives off no fumes; consumes no power during stops. Thus, it makes efficient use of power, and the current used for charging its batteries is the lowest-cost power available. Its electric-motor drives have a minimum of wearing parts and are inherently simple and trouble-free.

A battery industrial truck is most dependable and most economical when powered by EDISON Nickel-Iron-Alkaline Batteries. With steel cell construction, a solution that is a natural preservative of steel, and a fool-proof principle of operation, they are the most durable, longest lived, and most trouble-free of all types of batteries. *Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, New Jersey. In Canada: International Equipment Company, Montreal and Toronto.*



EDISON

Nickel • Iron • Alkaline

STORAGE BATTERIES

pheric conditions, they can be built with stainless steel ventilating tubes, fans and end plates and cast iron terminal boxes and collector ring enclosures.

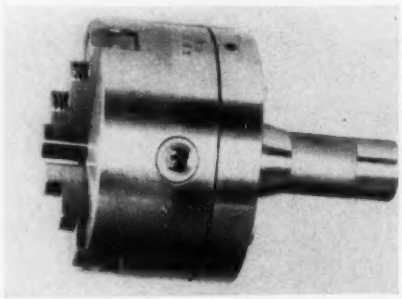
15. Fork Truck Uprights

Higher tiering is possible with the new type lift upright developed by Clark Tructractor Division, Clark Equipment Co., Battle Creek, Mich., for its Clipper fork lift trucks. Overall height of the basic standard lift is 83 inches with forks lowered and permits passage through 7-foot doors.

Maximum tiering height has been increased from 108 to 124 inches. Clipper line of trucks has a lift capacity of 2000 pounds and is produced in both gas and electric battery powered models.

16. Grinder Chuck

A new chuck for the fixture of the D-S radial relief grinder is announced by D-S Grinder Division of Royal Oak Tool & Machine Co., Royal Oak, Mich. Chuck, with a capacity of 1/8 to 5 inches, is mounted on a face plate equipped with ground arbor that fits the fixture spindle. Adjustment can be made between chuck and face plate to assure chuck concentricity. It is



of three jaw type, with an extra set of jaws and wrench.

17. Radiation Pyrometer

Temperatures above 1000°F may be quickly and accurately determined by the self contained Pyro radiation pyrometer, made by Pyrometer Instrument Co., 103 Lafayette St., New York, N. Y. Weighing less than 2 pounds and being direct reading, the instrument is completely automatic in operation and requires no skill to use. It is necessary to sight the instrument at the object being measured and then read the temperature on its wide scale. A locking device holds the pointer in position at the reading.

Operation is based upon the established laws of radiant heat. A sensitive vacuum thermocouple is sighted at the object being measured and the resultant electromotive force operates a galvanometer calibrated in direct degrees of temperature. It is immune to external magnetic and electrical influences.

18. Trolley Batcher

With low overall height for easy charging, the new Lo-Bin Batcher, designed by C. S. Johnson Co., Champaign, Ill., will serve the three standard size portable mixers. Easily charged from stockpiles or directly from an embankment, the batcher has a storage capacity of 30 tons with extension panels. Its height is 9-1/2 feet or 7-1/2 feet with panels removed. Level struck capacity is 8 tons.

Batcher hopper and scale beam box are suspended from frame work riding on four hardened steel wheels. Hopper is cantilevered beyond wheels and end of track. Adjustable legs lower bin and batcher 9 inches or raise

(For more information, use the card following page 134.)

A Complete Warehouse Service for...
SHEETS • PLATES
STRIP • STAINLESS STEEL
TIN PLATE • BARS • SHAPES
WIRE PRODUCTS • ALLOYS
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Tri-Boro Steel Supply Co., Inc.

HALF-HOUR CLEANING JOB

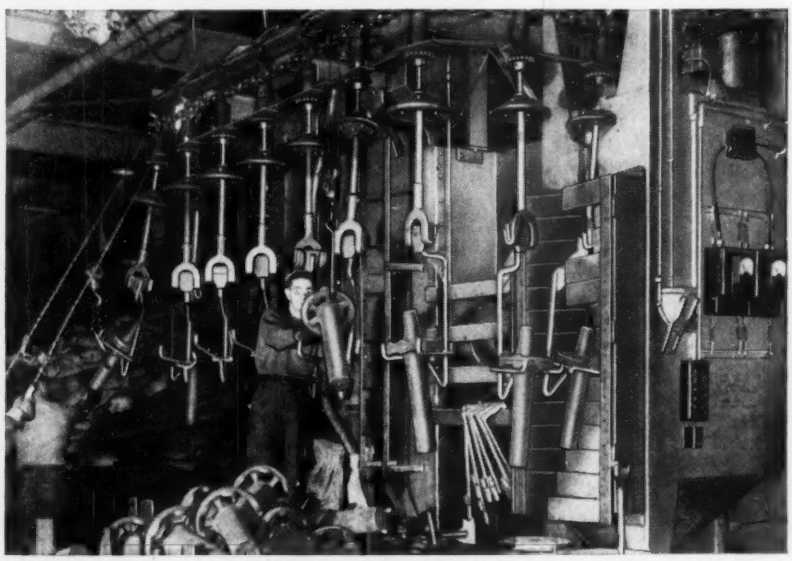
Wheelabrated in 1½ MINUTES

THE PROBLEM—Due to the excessive time required to clean forged aviation crankshafts, propellor shafts, etc., production schedules were difficult to maintain at Wyman-Gordon Company, Worcester, Mass. Special individual handling of the heavy, bulky pieces made the work slow and costly. The daily cleaning of more than 200 tons of smaller forgings presented an additional problem.

THE SOLUTION—The installation of a Wheelabrator Cabinet with heavy duty conveyor system for handling the larger pieces on a production line basis was made. Two airless Wheelabrator blast units are employed in the cabinet to provide complete abrasive coverage of all pieces and to permit the cleaning of the many different sizes of forgings produced.

Cleaning time for 550 pound crankshafts and other bulky, heavy pieces was reduced from 30 minutes to 1½ minutes. A steady procession of these large forgings passes through the machine at a continuous rate of one every minute and a half.

For cleaning smaller forgings, five Wheelabrator Tumblasts are utilized. The daily production of more than 200 tons of miscellaneous forgings is handled in these machines.



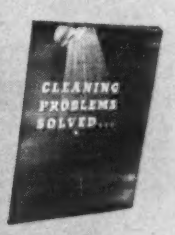
Cleaning forgings in a Wheelabrator Cabinet at Wyman-Gordon Co., Worcester, Mass.

Partial List of Heat Treat & Forged Parts Cleaned by Wheelabrator

Bearings	Gears
Cutlery	Spines
Pinions	Rakes
Shovels	Hoes
Axles	Valves
Springs	Chains
Wheels	Sprockets
Tool bits	Drills
Wrenches	Pliers
Washers	Files
Saws	Chisels
Hammers	Dies
Reamers	Shafts

Used by Leading Heat Treat & Forge Shops

S.K.F. Industries, Inc.
Thompson Products Inc.
Timken-Detroit Axle Co.
Allis Chalmers Mfg. Co.
Reed Roller Bit Co.
Stanley Rule and Level Co.
Remington Arms Co.
Ford Motor Co.
Cushman Chuck Co.
General Electric Co.
L. S. Starrett Co.
Nash-Kelvinator Corp.
Ex-Cell-O Corp.
Caterpillar Tractor Co.
Timken Roller Bearing Co.
Kelsey Hayes Wheel Co.
Ingersoll-Rand Co.
Oliver Farm Equipment Co.
Ross Gear & Tool Co.
International Harvester Co.
Billings & Spencer Co.
Plomb Tool Co.
Park Drop Forge Co.
Simonds Saw & Steel Co.
Union Fork & Hoe Co.



Write for latest booklet "CLEANING PROBLEMS SOLVED . . . in the Heat Treating and Forging Industry."

American
WHEELABRATOR & EQUIPMENT CORPORATION
(Formerly American Foundry Equipment Co.,)
509 S. Byrkit St. Mishawaka 5, Ind.
WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

it 18 inches. Two large fill valves under each of the sand and stone compartments are operated to fill the batcher. Two weigh beams have a 1600-pound capacity each.

19. Lift Truck

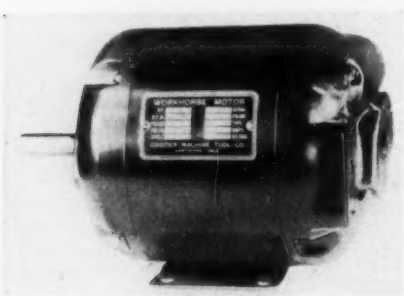
Skid loads up to 2500 pounds may be handled with the single stroke lift truck announced by Lyon-Raymond Corp., 4522 Madison St., Green, N. Y. Features include greater underclearance for negotiating ramps and

light weight, both made possible by a single frame design incorporating heavy gage formed steel plate.

Eight-inch diameter front wheels with Timken roller bearings insure easy rolling. Truck has a 180-degree operating radius, pushbutton action to engage the lifting device, safety lock on handle and a built-in hydraulic release check. A range of sizes for use with all popular size skid platforms is made.

20. Electric Motor

Of heavy duty and/or long hour and capacitator type, a single phase, 1/2-horsepower, 115/230 volt electric motor, made by Crozier Machine Tool



Co., Hawthorne, Calif., developed 3520 revolutions per minute (2 poles) or 1760 revolutions per minute (4 poles) due to low slippage. Light in weight, the motor, called the Workhorse, will operate on either 50 or 60 cycles.

It has a 16-gage sheet steel case and is lubrication sealed for life. Having ball bearings throughout it can be run in any position, in temperatures of 40°. Motor has welded steel stator frame and cast aluminum squirrel cage. Winding is Fornvar insulated wire which is later varnish impregnated and baked. Starting torque is 220 per cent and motor will withstand a 25 per cent overload.

DEVELOPED BY . . .

21. Oil-Rite Corp., Milwaukee 7, Wis., style FSX flow sight for gravity or pressure fed lines with flow of liquid downward through a nozzle. It is offered in three diameters and with six pipe threads.

22. Kellogg Division, American Brake Shoe Co., Rochester 9, N. Y., Micro-Spray gun which produces a high gloss finish through finer atomization of the paint. Only one needle is required for all paint spraying.

23. Thermo Electric Mfg. Co., Dubuque, Iowa., series 1000 Temcometer stepless temperature controller for use with electric furnaces, melting pots, etc. Knob controls thermostatic switch between 5 and 100 per cent "on".

24. Charles Hardy Inc., New York 17, N. Y., a refractory metal powder with good green strength, stainless steel powder type 18-8. Pressed compacts may be sintered in neutral or reducing atmospheres.

25. Jefferson Electric Co., Bellwood, Ill., Saf-T-Lag thermal fuses which eliminate blowing due to harmless overloads or starting in-rushes. Thermal connection breaks when temperatures reaches 280° F.

26. State Chemical Corp., New York 1, N. Y., Permacote transparent liquid "skin" for corrosion and deterioration protection from moisture, acids, alkalis, dyes, dirt, dust, etc. It may be applied by brush spray or dip.

27. Mosebach Electric & Supply Co., Pittsburgh 3, Pa., an instrument which detects leakage currents in direct current power distribution systems. It is primarily a means of detecting condition of the insulation.

28. Harnischfeger Corp., Milwaukee 14, Wis., series of four Hartop hard-surfacing electrodes covering rock-well C range of from 35 to 63, as deposited. Welds flow smoothly without sputtering and leave no slag.

29. Nilsson Gage Co. Inc., Poughkeepsie, N. Y., Nilco dial snap gage which has a vernier adjusting stud, permitting ¼-inch adjustments in gaging pin or moveable anvil. The adjustment can be locked, with gaging pin remaining free.

30. Severance Tool Industries Inc., 770 Iowa St., Saginaw, Mich., Micro-Mills with forward end relieved, making it possible to finish bottom of blind holes. Mills are made in 10 sizes for various other operations.

31. Downs Crane & Hoist Co., Los Angeles 37, Calif., lightweight, easy operate Drum Chime tongs for moving, loading and stacking drums. All drums with or without heads from 18 to 24 inches in diameter may be handled.

32. Wendt-Sonis Co., Hannibal, Mo., long shank masonry drill, carbide tipped. Diamond shape provides clearance to allow hole to clean as it is drilled. Various diameters and lengths are made.

33. Willey's Carbide Tool Co., Detroit, Mich., an axial face mill for cast iron, designed to handle straight facing and heaving roughing cuts, as well as finish milling. Blades are of E5, E6 or E8 solid carbide.

34. Linde Air Products Co., New York 17, N. Y., the Oxweld V-31 quick shutoff valve which prevents welding oxygen and acetylene waste. Valve, equipped with a pilot light, is used with a blowpipe which, when hung up, automatically shuts off the gas.

35. CCA Products Inc., Glendale 5, Calif., transparent plastic bowl filter-lubricators and single air line filters for air operated equipment. All operation is automatic.

36. Lehigh Safety Shoe Co., Allentown, Pa., the Executive safety shoe for both plant and dress wear. It has Chrotan sole, half-rubber heel and steel shank and toe.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

STEEL PRICES—General upturn in steel prices appears to be in the making. Leading producers last week shifted from the gross to the net ton in quoting semifinished carbon steel products, the change resulting in a price increase of between 11 and 12 per cent. With the accompanying adjustment in applicable extras, buyers now will have to pay an average of about $6 per ton more for the various semifinished steel products. Similar action is pending on alloy semifinished products.

At the same time pipe and tubing prices were advanced last week an average of about $7 per ton, size extras were increased on structural shapes, one producer of nails and staples raised prices $20 per ton, a producer of hot and cold-rolled strip advanced prices $10 per ton, a producer of electrical sheets raised two grades $15 to $25 per ton and a platemaker raised prices $6 per ton.

COMPOSITES RISE—STEEL's composite market averages rose last week as follows: On finished steel to $81.14 from $78.59 the previous week and $69.82 for the like week a year ago; on semifinished steel to $68.72 from $65.60 for the previous week and $52.10 a year ago; and on steelmaking pig iron to $39.38 from $39.23 for the previous week and $29.56 a year ago. Composite price average on steelmaking scrap held unchanged at $40.58.

SIGNIFICANT MOVE—More than ordinary significance is attached to the change on semifinished. While it is in line with the general standard for quoting finished steel products, the shift to the net ton with resulting price hike just prior to the opening of wage negotiations, is seen as an initial step toward a general price rise anticipatory to a wage increase.

Nonintegrated producers, dependent on the larger interests for their semifinished supplies, are expected to increase their prices immediately. In fact, one producer attributed its increase of $10 per ton on hot and cold-rolled strip to higher production costs including the new increase in billet prices. As a general thing it is expected a substantial increase will be effected all along the line on finished products once the anticipated wage increase is determined.

COMPLICATIONS LIKELY—Shift from the gross to the net ton on semifinished has been sought for years by steel interests to facilitate statistical and accounting procedures. However, some complications are likely to develop as result of the change due to the fact freight rates are on a gross ton basis for semifinished. This brings up the possibility of an upward revision in rail charges.

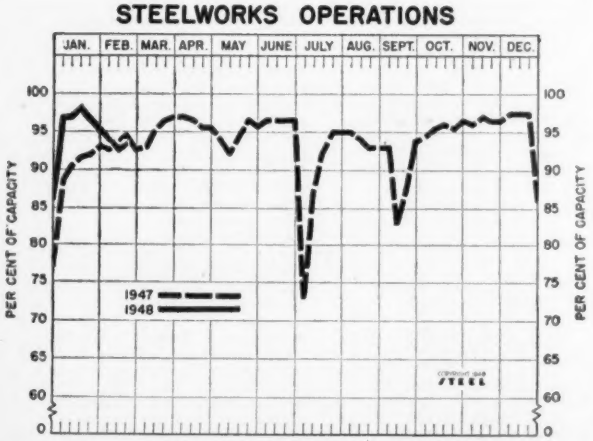
DEMAND PRESSING—The recent break in the commodity and securities markets has not yet been definitely reflected in steel demand to any noticeable extent. Here and there buyers are showing a little more caution but as a general thing the pressure for deliveries of the major steel products continues unabated.

Sheet and strip consumers are being promised less new tonnage for second quarter because of mill arrearages. Carbon bars continue tight but some easing in the stringency in second quarter is indicated.

OUTLOOK ENCOURAGING—Higher and more consistent rate of steel production is indicated with milder weather at hand and raw materials, especially scrap, moving in better volume. Consequently, despite mill arrearages and priority tonnage under the government allocation program, rank and file consumers appear due to receive a substantial share of their second quarter requirements. The outlook for demand continues strong but only some major labor disturbance, such as a coal mine strike, will likely upset the prospect for gradual improvement in supply conditions.

SCRAP FREER—Iron and steel scrap is coming onto the market more freely as result of milder weather, and it would not be surprising if an easier price trend develops over coming weeks.

STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended Feb. 21	Change	Same Week 1947	Same Week 1946
Pittsburgh	91	+ 2	99	17.5
Chicago	92.5	None	92	24
Eastern Pa.	91	+ 1	89	13
Youngstown	102	None	89	20
Wheeling	90	+ 1.5	87.5	63
Cleveland	95	— 1	93	17
Buffalo	86	None	90.5	23.5
Birmingham	100	None	99	12
New England	83	+ 4	92	45
Cincinnati	90	+ 5	96	70
St. Louis	82.5	+ 4.5	69	19
Detroit	89	— 3	92	34
Estimated national rate	93.5	+ 0.5	94.5	16

Based on weekly steelmaking capacity of 1,802,476 net tons for 1948; 1,749,928 tons for 1947; 1,762,381 tons for 1946.

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COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	Feb. 21	Feb. 14	Month Ago Jan. 1948	Year Ago Feb. 1947	5 Years Ago Feb. 1943
Finished Steel	$81.14	$78.59	$78.26	$69.82	$56.73
Semifinished Steel	68.72	65.60	60.46	52.10	36.00
Steelmaking Pig Iron	39.38	39.23	38.50	29.59	23.00
Steelmaking Scrap	40.58	40.58	40.75	33.50	19.17

FINISHED STEEL WEIGHTED COMPOSITE†

Dec. 1947	3.49055c
Nov. 1947	3.47536c
Dec. 1946	2.91932c
Dec. 1942	2.38793c

* Straight Arithmetical Composites: Computed from average industry-wide base prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (rerolling billets and slabs, sheet bars, skelp, and wire rods), on Basic Pig Iron (at eight leading basing points), and on Steelworks Scrap (No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Finished Steel arithmetical composite, dollars per net ton on net ton basis; others, gross ton.

† Finished Steel Weighted Composite: Computed in cents per pound, base prices, weighted by actual monthly shipments of following products, representing 80 per cent of total steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates; standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip.

COMPARISON OF PRICES

Representative market figures for current week; average for last month, three months and one year ago. Finished material (except tin plate) and wire rods, cents per lb; semifinished (except wire rods) and coke, dollars per net ton; others, dollars per gross ton.

Finished Materials

	Feb. 21, 1948	Jan., 1948	Nov., 1947	Feb., 1947
Steel bars, Pittsburgh	2.90c	2.90c	2.90c	2.60c
Steel bars, del. Philadelphia	3.356	3.348	3.318	2.98
Steel bars, Chicago	2.90	2.90	2.90	2.60
Shapes, Pittsburgh	2.80	2.80	2.80	2.50
Shapes, del. Philadelphia	2.968	2.966	2.954	2.64
Shapes, Chicago	2.80	2.80	2.80	2.50
Plates, Pittsburgh	2.95	2.95	2.95	2.65
Plates, del. Philadelphia	3.19	3.186	3.17	2.85
Plates, Chicago	2.95	2.95	2.95	2.65
Sheets, hot-rolled, Pittsburgh	2.80	2.80	2.80	2.50
Sheets, cold-rolled, Pittsburgh	3.55	3.55	3.55	3.20
Sheets, No. 10 galv., Pittsburgh	3.95	3.93	3.90	3.55
Sheets, hot-rolled, Gary	2.80	2.80	2.80	2.50
Sheets, cold-rolled, Gary	3.55	3.55	3.55	3.20
Sheets, No. 10 galv., Gary	3.95	3.93	3.90	3.55
Strip, hot-rolled, Pittsburgh	3.05	2.80	2.80	2.50
Strip, cold-rolled, Pittsburgh	3.80	3.55	3.55	3.20
Bright basic, bess. wire, Pittsburgh	3.775	3.675	3.675	3.425
Wire nails, Pittsburgh	5.20	4.67	4.625	4.125
Tin plate, per base box, Pittsburgh	$6.70	$6.70	$5.75	$5.75

Semifinished

Sheet bars, Pittsburgh, Chicago	$60.00	$60.00*	$60.00*	$50.00*
Slabs, Pittsburgh, Chicago	46.00	47.50*	47.50*	42.00*
Rerolling billets, Pittsburgh	46.00	47.50*	47.50*	42.00*
Wire rod ⅜ to ¼-inch, Pitts.	3.175c	3.10c	3.05c	2.55c

* Per gross ton.

Pig Iron

	Feb. 21, 1948	Jan., 1948	Nov., 1947	Feb., 1947
Bessemer, del. Pittsburgh (N.&S. sides)	$40.996	$40.379	$37.913	$31.83
Basic, Valley	39.00	38.40	36.00	30.00
Basic, eastern del. Philadelphia	42.004	41.372	38.84	32.01
No. 2 fdry., del. Pgh. (N.&S. sides)	40.496	39.879	37.418	31.33
No. 2 fdry., del. Philadelphia	42.504	41.871	39.34	32.51
No. 2 foundry, Chicago	39.00	38.60	36.00	30.50
No. 2 foundry, Valley	39.50	36.50	36.50	30.50
Southern No. 2, Birmingham	37.88	34.88	34.88	26.88
Southern, No. 2, del. Cincinnati	40.74	37.74	38.544	31.75
Malleable, Valley	39.50	38.90	36.50	30.50
Malleable, Chicago	39.50	39.10	36.50	30.50
Charcoal, low phos., fob Lyles, Tenn.	55.00	50.00	46.40	37.50
Ferromanganese, fob cars, Pittsburgh	151.00	151.00	151.00	140.25

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$40.50	$40.30	$40.00	$34.48
Heavy melt. steel, No. 2, E. Pa.	39.00	41.30	41.625	33.25
Heavy melt. steel, No. 1, Chicago	39.25	39.05	38.75	31.25
Heavy melt. steel, No. 1, Valley	40.25	40.04	39.375	34.56
Heavy melt. steel, No. 1, Cleveland	39.75	39.75	39.625	32.50
Heavy melt. steel, No. 1, Buffalo	43.50	43.30	41.81	34.00
Rails for rerolling, Chicago	49.75	60.00	56.25	38.50
No. 1 cast, Chicago	66.00	63.50	49.00	42.50

Coke

Connellsville, beehive furnace	$12.50	$12.50	$12.25	$8.87
Connellsville, beehive foundry	14.75	14.60	14.50	10.00
Chicago, oven foundry, del.	19.25	19.19	18.60	16.19

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per net ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $90-$95 per gross ton. Forging quality $46, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, $56, per gross ton.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, $45-$47; sales by smaller interests on negotiated basis at $85 per gross ton, or higher.

Forging Quality Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, $54.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $66 per gross ton.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Youngstown, $60 nom.; sales in open market $95-$105 per gross ton.

Skelp: Pittsburgh, Youngstown, 2.90c per lb.

Tube Rounds: Pittsburgh, Chicago, Gary, Cleveland, $69-70; some sellers quoting up to $120.

Wire Rods: Pittsburgh, Chicago, Birmingham, ⅜ to ¼-inch., inclusive, $2.80-3.55 per 100 lb. ⅜ to 11/32-in., inclusive, $2.75, Cleveland; Galveston, $2.95; Worcester, $2.90-2.95. San Francisco (base del.), $3.5245.

Bars

Hot-Rolled Carbon Bars (O.H. only) and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, base, 20 tons one size, 2.90c; Detroit, del., 3.06c; eastern Mich., 3.13c; New York, del., 3.392c; Phila., del., 3.356c; San Francisco (base, del.), 3.6345-3.95c; Los Angeles (base, del.), 3.629-3.86c; Seattle, 3.85c, base.

Rail Steel Bars: Same basing points as merchant carbon bars, except base is 10 tons. Prices upon application.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.30c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lb., 3.55c; Detroit, del., 3.71c; Toledo, 3.78c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 4.10c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.75c; San Francisco (base, del.), 3.3345c; Los Angeles (base, del.), 3.329c; Seattle, 3.88c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo. Prices upon application.

Iron Bars: Single refined, Pittsburgh 7.15c-†7.70c, double refined 8.60-†9.75c; Pittsburgh, staybolt, 8.85c-†11.25c.

† Hand puddled.

Sheets

Hot-Rolled Sheets (18 gage and heavier): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Ashland, Ky., base, 2.80c; Granite City, 3.175c; Detroit, del., 2.96c; eastern Mich., del., 3.03c; Philadelphia, del., 3.04c; New York, del., 3.172c; Los Angeles (base, del.), 3.544c; San Francisco, (base, del.), 3.5495c. (Alan Wood Steel Co., Conshohocken, Pa., quotes 3.40c, Sparrows Point equivalent).

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.55c; Granite City, 3.65c; Detroit, del., 3.71c; Eastern Mich., del., 3.78c; New York, del., 4.042c; Philadelphia, del., 4.006c.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham, 3.95c; Youngstown, Sparrows Point, Canton, Middletown, base, 3.95c; Granite City, 4.35c; New York, del., 4.322c; Philadelphia, del., 4.19c; Los Angeles (base, del.), 4.724c; San Francisco (base, del.), 4.7295c.

Corrugated Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham base, 4.05c.

Culvert Sheets, No. 16 flat: (Based on 5 cent zinc; corrugated 10 cents extra) Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.55c; copper-iron or pure iron, 4.80c. Granite City 5.00c and 5.35c, respectively. Los Angeles (base, del.), 5.344c; San Francisco (base, del.), 5.3495c.

Aluminized Sheets: Hot-dipped, coils or cut lengths: Pittsburgh, 7.50c.

Stainless-Clad 20%: Pittsburgh, Washington, Coatesville, Pa., No. 304, 22.00c; No. 410, 20.00c; No. 430, 20.50c; No. 446, 27.00c. Prices include annealing and pickling.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 4.05c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 3.95c; Granite City, 4.05c; Detroit, del., 4.11c; eastern Mich., 4.18c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.50c; Kokomo, Ind., 4.60c. Armature: Pittsburgh, Chicago, Gary, 4.80c. Granite City, Ill., 5.25c; Kokomo, Ind., 4.90c. Electrical: Pittsburgh, Chicago, Gary, 5.35c. Granite City, Ill., 5.75c; Kokomo, Ind., 5.40c. Motor: Pittsburgh, 6.05-6.80c; Chicago, Gary, 6.05c; Granite City, 6.50c.

Dynamo: Pittsburgh, 6.75c: Granite City, 7.20c. Transformer 72, 7.25-8.25c; 65, 7.75-9.20c; 58, 8.65-9.90c; 52, 9.45c, Pittsburgh.

* Wor... Francisco
** Wor... $5.20 (b... $5.9845.
† Wor... N. J., $4... $5.6345 b...

Strip

Hot-Rolled Strip: Pittsburgh, 2.80c-3.30c; Chicago, Gary Birmingham, Youngstown, base, 2.80c; Detroit, del., 2.96c; eastern Mich., del., 3.03c; San Francisco (base, del.), 3.605c; Los Angeles (base, del.), 3.60c.

Cold-Rolled Strip: 0.25 carbon and less: Pittsburgh, 3.55c-4.05c; Cleveland, Youngstown, 3.55c; Chicago, base, 3.65c; Detroit, del. 3.71c; eastern Mich., 3.78c; Worcester, base, 3.75c-4.45c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.55c; over 0.40 to 0.60 carbon, 5.05c; over 0.60 to 0.80, 5.65c; over 0.80 to 1.05, 7.15c; over 1.05 to 1.35, 9.45c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., per base box of 100 lb, 1.25 lb coating $6.60, 1.50 lb coating $6.80; Granite City, Birmingham, Sparrows Point, 1.25 lb coating $6.70, 1.50 lb coating $6.90.

Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., per base box of 100 lb, 0.25 lb tin, $5.80; 0.50 lb tin, $6.00; 0.75 lb tin $6.20; Granite City, Birmingham, Sparrows Point, $5.90, $6.10, $6.30, respectively.

Can Making Black Plate: Pittsburgh, Gary, Warren, O., per base box of 100 lb. 0.55 to 0.70 lb tin, $5.20; 0.75 to 0.95 lb tin, $5.10; 100 to 128 lb tin, $5.20.

Hollowware Enameling Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage, 4.75c per lb; Granite City, Birmingham, Sparrows Point, 4.85c per lb.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, per base box of 100 lb, $5.90; Granite City, Birmingham, Sparrows Point, $6.00.

Roofing Ternes: Pittsburgh, per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $15.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.95c; Coatesville, 3.45c; Claymont, 3.65c; Geneva, Utah, (base, del.), 3.125c; Det., del., 3.21c; New York, del., 3.322c; Phila., del., 3.19c; Boston, del., 3.423c; St. Louis, del., 3.269c; San Francisco and Los Angeles, del., 3.693c for sizes and grades produced at Geneva, 3.76c for sizes and grades produced at Fontana, Calif.

(Central Iron & Steel Co., Harrisburg, Pa., 4.75c, basing points.)

Floor Plates: Pittsburgh, Chicago, Cleveland, 4.20c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.80c-4.137c; Coatesville, 4.80c.

Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 24.00c. Pittsburgh, Washington, Coatesville, Pa., 20% stainless-clad, base prices including annealing and pickling; No. 304, 24.00c; No. 410, 22.00c; No. 430, 22.50c; No. 446, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.80c; New York, del., 3.088c; Phila., del., 2.968c; Geneva, Utah (base, del.), 2.975c; Los Angeles (base, del.), 3.41-3.474c for sizes produced at Torrance, Calif., beyond sizes at Geneva; Los Angeles and San Francisco, del., 3.543c for sizes produced at Geneva; San Francisco, del., 3.41c for sizes produced at Fontana, Calif.

Alloy Structural Shapes: Pittsburgh, Chicago, 3.55c.

Steel Piling: Pittsburgh, Chicago, Buffalo, $3.30 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds.)

Wire to Manufacturers in carloads

Bright, basic or bessemer	*$3.55-4.00
Basic MB Spring (except Birm.)	**$4.95
Upholstery Spring (except Birm.)	†$4.60

Wire Products to Trade in carloads

Wire, Merchant Quality

Annealed (6 to 8 base)	††$4.20
Galvanized (6 to 8 base)	††$4.65

(Fob Pittsburgh, Chicago, Duluth, Birmingham, per base column).

Nails

Standard, cement-coated, galvanized	‡94
Staples, polished and galvanized	‡‡94
Woven fence, 15 gage and heavier	§100
Barbed wire, 80-rod spool	§§113
Fence Posts (with clamps)	107
Bale ties, single loop	§99

* Worcester, $3.65, Duluth, $3.60, base, San Francisco (base, del.), $4.56, bright basic only.

** Worcester, $5.05; Duluth & Trenton, N.J., $5.20 (bright only); San Francisco (base del.) $5.9845.

† Worcester $4.70, Duluth & Trenton, N. J., $4.85, base. San Francisco (base, del.) $5.6345 black upholstery.

†† Worcester $4.30, annealed. $4.75, galvanized. Duluth $4.20, annealed. $4.65, galvanized. San Francisco (base, del.) $5.21, annealed; $5.66 galvanized.

‡ Col. 114 also quoted Pittsburgh; Worcester 100; Cleveland 97; San Francisco (base, del.) 115.

‡‡ Col. 114 also quoted Pittsburgh; Worcester 100; San Francisco (base del.) 115.

§ San Francisco (base del.) 123.

§§ San Francisco (base del.) 133.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.75 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $3.10 per 100 lb; light rails (rail steel), Williamsport, Pa., Pittsburgh prices upon application.

Relaying, 60 lb and over fob warehouse $60-$65 per net ton.

Supplies: Track bolts, 7.00c; heat treated, 7.25c. Tie plates, $3.65 per 100 lb, fob mill; $3.40 base, Seattle; $3.20, base, Pittsburg, Calif. Splice bars $3.85 per 100 lb, fob mill. Standard spikes, 4.85c; screw spikes, 6.75c. Axles, 4.50c.

Tubular Goods

Standard Steel Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

	Butt Weld			Butt Weld	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	44½	17	1	52½	36½
¼	44½	21½	1¼	53	37
⅜	41	17	1½	53½	37½
½	47	29½	2	54	38
¾	50	33½	2½ & 3	54½	38½

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2	44½	28	44	27½	43½	27
2½-3	48½	32	47	30½	46½	30
3½-6	50½	34	49	32½	48½	32

Line Steel Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

	Butt Weld		Butt Weld
In.		In.	
⅛	43½	1	51½
¼	43½	1¼	52
⅜	40	1½	52½
½	46	2	53
¾	49	2½ & 3	53½

In.	Lap Weld	Elec. Weld	Seamless
2	43½	43	42½
2½ & 3	47½	46	45½
3½-6	49½	48	47½
8	55½	50	49½
10	55	49½	49
12	54	48½	48

Boiler Tubes: Net base prices per 100 ft, fob Pittsburgh, in carload lots, minimum wall thickness, cut lengths 4 to 24 feet, inclusive.

		——Seamless——		—Elec. Weld—	
O.D.		Hot	Cold	Hot	Cold
Sizes	B.W.G.	Rolled	Drawn	Rolled	Drawn
1"	13	....	$12.46	$11.51	$11.51
1¼"	13	....	14.76	11.48	13.64
1½"	13	$14.00	16.47	12.69	15.22
1¾"	13	15.92	18.74	14.43	17.31
2"	13	17.84	20.99	16.17	19.39
2¼"	13	19.88	23.40	18.02	21.62
2¼"	12	21.90	25.77	19.86	23.80
2½"	12	23.99	28.21	21.75	26.06
2¾"	12	25.42	29.90	23.05	27.63
3"	12	26.68	31.40	24.18	29.00
3¼"	11	31.06	36.55	28.16	33.77
3½"	11	33.35	39.26	30.23	36.27
4"	10	41.40	48.70	37.53	44.99
4½"	9	54.87	64.58	....	....
5"	9	63.52	74.74	....	....
6"	7	97.51	114.73	....	....

Pipe Cast Iron: Class B, 6-in. and over $79.50 per net ton, Birmingham; $84.50, Burlington, N. J.; $91.12, del. Chicago; 4-in. pipe, $5 higher; class A pipe, $5 a ton over Class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	45 off
⅞ and ⅝ x 6-in. and shorter	46 off
¾-in. and larger x 6-in. and shorter	43 off
All diameters longer than 6-in.	41 off
Tire bolts	35 off
Step bolts	43 off
Plow bolts	54 off
Lag bolts	
All diameters 6 in. and shorter	46 off
All diameters longer than 6 in.	44 off

Stove Bolts

In packages, nuts separate, 65-10 off; bulk 75 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅞-in. and smaller	46 off	....
½-in. and smaller	....	44 off
½-in.-1-in.	44 off	....
⅝-in.-1-in.	....	43 off
1⅛-in.-1½-in.	42 off	41 off
1⅝-in. and larger	....	35 off

Additional discount of 15 for full containers.

Hexagon Cap Screws (Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright)	53 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter	48 off
¾, ⅞, & 1 x 6 and shorter	44 off

Square Head Set Screws

Upset 1-in. and smaller	57 off
Headless, ¼-in. and larger	40 off
No. 10 and smaller	52 off

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural ½-in. and larger	5.65c
Lebanon, Pa.	5.80c
½-in. and under	55 off
Lebanon, Pa.	55 off plus 15c per cwt

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, ici | $1-$2 off

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 16.00-17.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base Per lb
18.00	4	1	...	82.00c
1.5	4	1	8.5	59.00c
12	3	0.50	...	67.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	4	4.50	80.00c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301	26.00c	29.50c	37.00c	22.00c	28.00c
302	26.00	29.50	37.00	23.50	30.50
303	28.50	31.50	39.00	29.50	38.00
304	27.50	31.50	39.00	25.50	32.50
308	31.50	37.00	44.50	31.00	38.00
309	39.00	43.50	51.00	40.50	51.00
310	53.50	56.50	57.50	53.00	61.00
316	43.50	48.00	52.00	43.50	52.00
321	31.50	37.00	44.50	32.00	41.50
347	36.00	41.50	49.00	36.00	45.50
431	21.00	24.00	31.50	19.00	24.50
440A	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
403	23.50	27.00	32.00	23.00	29.50
410	20.50	23.50	29.00	18.50	24.00
416	21.00	24.00	29.50	20.00	25.50
420	26.00	31.00	36.50	26.00	39.50
430	21.00	24.00	31.50	19.00	24.50
430F	21.50	24.50	32.00	20.50	27.00
442	24.50	28.00	35.50	26.00	35.00
443	24.50	28.00	35.50	26.00	35.00
446	30.00	33.00	39.50	38.00	56.50
†501	9.00	13.00	17.50	13.00	18.50
†502	10.00	14.50	18.50	14.50	19.50
‡STAINLESS CLAD STEEL (20%)					
304	....	....	24.00	22.00	....	....
410	....	....	22.00	20.00	....	....
430	....	....	22.50	20.50	....	....
446	....	....	29.00	27.00	....	....

† Low chromium. ‡ Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., base	$40.00	$40.50	$41.00	$41.50
Newark, N. J., del.	42.208	42.708	43.208	43.708
Brooklyn, N. Y., del.	....	44.10	44.60	....
Philadelphia, del.	42.004	42.504	43.004	43.504
Birmingham, base	35.88†	36.38†	....	....
Cincinnati, del.	....	40.74	....	....
Buffalo, base	40.00†	40.00†	40.50†	41.00
Boston, del.	47.776	47.776	48.276	....
Rochester, del.	42.22	42.22	42.72	43.22
Syracuse, del.	43.025	43.025	43.525	44.025
Chicago, base	38.50	39.00	39.50	40.00
Milwaukee, del.	40.08	40.58	41.08	41.58
Muskegon, Mich., del.	....	43.60	44.10	....
Cleveland, fob furnace	38.50†	39.00†	39.50†	40.00
Akron, del.	40.50	41.00	41.50	42.00
Duluth, base	39.00	39.50	40.00	40.50
Erie, Pa., base	38.50	39.00	39.50	40.00
Everett, Mass., base	....	45.00	45.50	....
Granite City, Ill., base	39.50	40.00	40.50	....
St. Louis, del	40.25	40.75	41.25	....
‡Neville Island, Pa., base	39.00	39.50	39.50	40.00
Pittsburgh, del., N.&S. Sides	39.996	40.496	40.496	40.996
Provo, Utah, base	39.00	39.50	....	....
Seattle, Tacoma, Wash., del.	....	46.63	....	....
Portland, Oreg., del.	....	46.63	....	....
Sharpsville, Pa., base	39.00	39.50	39.50	40.00
Steelton, Pa., base	40.00	40.50	41.00	41.50
Struthers, O., base	39.50	....	....	....
Swedeland, Pa., base	45.00	45.50	46.00	46.50
Toledo, O., base	38.50	39.00	39.50	40.00
Cincinnati, del.	42.70	43.20	....	....
Youngstown, O., base	39.00	39.50	39.50	40.00
Mansfield, O.	42.57	43.07	43.07	43.57

† Republic Steel Corp. quotes $3 a ton higher at Birmingham, effective Jan. 1, 1948; Republic quotes $5.50 higher for No. 2 foundry and malleable and $5.00 higher for basic at Buffalo, and $1.25 higher at Cleveland, effective on shipments during week ended Feb. 22.

‡ To Neville Island base add: 79.2c for McKees Rocks, Pa., $1.212 Lawrenceville, Homestead, McKeesport, Monaco; $1.788 Oakmont; $1.596 Verona; $1.788 Brackenridge; 99.6c to Ambridge and Aliquippa.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent (base)....$47.50
6.51-7.00..$48.75 9.01- 9.50. 55.00
7.01-7.50.. 50.00 9.51-10.00. 56.25
7.51-8.00.. 51.25 10.01-10.50. 57.50
8.01-8.50.. 52.50 10.51-11.00. 58.75
8.51-9.00.. 53.75 11.01-11.50. 60.00

Fob Jackson, O., per gross ton; Buffalo base $3.25 higher. Buyer may use whichever base is more favorable.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron: Si 14.01-14.50%, $77.50, Jackson, O.; $78.75, Niagara Falls; $78 open-hearth and $79 foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn....$55.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $39.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., $46.00. Philadelphia, $48.592, delivered. Intermediate phosphorus, Central furnace, Cleveland, $42.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace	$12.00-$13.00
Connellsville, foundry	14.00- 15.50
New River, foundry	12.50
Wise county, foundry	11.15
Wise county, furnace	10.65

Oven Foundry Coke

Kearney, N. J., ovens	$18.75
Chicago, outside del.	18.00
Chicago, del.	19.25
Terre Haute, ovens	18.50
Milwaukee, ovens	18.75
New England, del.	19.60
Birmingham, del.	15.76
Indianapolis, ovens	18.50
Cincinnati, del.	18.95
Ironton, O., ovens	16.75
Erie, Pa., del.	19.45
Painesville, O., ovens	18.10
Cleveland, del.	19.60
Buffalo, del.	20.15
Detroit, del.	19.00
Philadelphia, ovens	17.75
Swedeland, Pa., ovens	17.75
Portsmouth, O., ovens	17.00

Coal Chemicals

Spot, cents per gallon

Pure and 90% benzol	21.00†
Toluol, two degrees	28.00
Industrial xylol	28.00
Solvent naphtha	28.00

Per pound fob works

Phenol (car lots, returnable drums)	12.50
Do., less than carlots	13.25
Do., tank cars	11.50

Eastern plants, per pound

Naphthalene flakes, balls, bbl, to jobbers, "household use"	11.00

Per ton, bulk, fob plants

Sulphate of ammonia	$40.00

† Freight allowed up to 2 cents.

Refractories

Net Prices

Per 1000, fob shipping point

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$92.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	73.00
Ala., Ga.	73.00
N. J.	78.00

Intermediate Heat Duty

Ohio	67.00
Pa., Ill., Md., Mo., Ky.	67.00
Ala., Ga.	59.00
N. J.	70.00

Low-Heat Duty

Pa., Md., Ohio	59.00

Ladle Brick

(Pa., O., Va., Mo.)

Dry Press	50.00
Wire Cut	48.00

Malleable Bung Brick

All bases	83.00

Silica Brick

Pennsylvania	73.00
Joliet, E. Chicago	82.00
Birmingham, Ala.	73.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	64.00
Chem. bonded chrome	64.00
Magnesite brick	86.00
Chem. bonded magnesite	75.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk	27.00
Single bags	31.50

Dolomite

Domestic, dead-burned, bulk, net tons, fob Billmeyer, Blue Bell or Williams, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg or Woodville, O., $11.05; Midwest (fob Thornton or McCook, Ill.), add $0.10; Missouri Valley (fob Dolly Siding, and Bonne Terre, Mo.), add $0.20.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.95
Old range nonbessemer	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.55
High phosphorus	5.55

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% contract	15.20

Foreign Ore

Cents per unit, cif Atlantic ports

No. African low phos.	Nom.
Swedish basic, 60 to 68%.	13.50
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro, nom.	5.50-6.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$26-$28

Manganese Ore

48-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 65.00-67.00c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	28.50
50% no ratio	29.50
Brazilian—nominal	
44% to 2.5:1 lump	$33.65
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo. cont., Mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $35; less than 60% $32.

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheet, Hot-Rolled	4.30	4.30	4.30	4.30	4.30	4.30	...	...	...
Cold-Rolled	5.30	5.30	5.30	5.30	...	5.30	...	...	...
Galvanized	6.00	...	...	...	...	6.00	...	...	...
Strip, Hot-Rolled	4.30	4.30	4.30	4.30	...	...	...	...	...
Cold-Rolled	5.30	5.30†	5.30†	5.30	...	...	...	...	...
Shapes, structural	4.30	4.30	...	4.30	...	...	4.30	...	...
Plates	4.55	4.55	4.55	...	4.55	...	...	...	...
Bars, Small Shapes	4.45	4.45	4.45	4.45	...	4.45	...	4.45	4.45

† Nax High Tensile, produced by Great Lakes Steel Corp., quoted 10 cents higher.

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. *10G	Gal. *24G	†H-R	†C-R	H-R Rds. ⅜" to 3"	C-F Rds. ½"& up	H-R Alloy (**4140)	Structural Shapes	Carbon ⅜"-¾"	Floor ⅜" & Thicker
Boston (city)	5.03	6.09[4]	5.79[4]	6.23[4]	7.58[4]	5.61	6.87	5.04	5.88	7.64	4.91	5.18	6.86
New York (city)	4.96	6.16	5.86	6.16	7.51	5.59	...	5.06	5.63	7.23	4.80	5.11	6.78
New York (country)	4.81	6.01	5.71	6.01	7.36	5.44	...	4.91	...	...	4.65	4.96	6.63
Philadelphia (city)	4.70	6 32	5.92	5.90	7.25	5.32	5.72	4.87	5.75	8.77	4.57	4.85	6.47
Philadelphia (country)	4.55	6.18	5.78	5.75	7.10	5.17	5.57	4.73	...	...	4.47	4.71	6.32
Baltimore (city)	4.32†	5.95	5.65	5.72	7.07	4.80	...	4.85	5.71	...	4.71	4.77	6.30
Baltimore (country)	4.17†	5.80	5.50	5.50	6.85	4.65	...	4.70	...	...	4.56	4.62	6.15
Washington (city)	4.81	...	...	...	...	5.08	...	5.14	5.79[12]	...	4.98	5.03	6.60
Washington (country)	4.71	...	...	...	...	4.98	...	5.04	...	...	4.88	4.93	6.50
Norfolk, Va.	4.90	...	...	...	...	...	...	5.20	6.00	...	5.15	5.15	6.90
Memphis, Tenn. (city)	4.82[20]§§	5.87[20]‡	...	6.37	...	5.02[20]	...	4.97[20]	5.87	...	4.97[20]	5.17[20]	6.87[20]
Memphis, Tenn. (country)	4.72[20]§§	5.77[20]‡	...	6.27	...	4.92[20]	...	4.87[20]	5.77	...	4.87[20]	5.07[20]	6.77[20]
Buffalo (city)	4.45	...	5.20[5]	6.05	...	5.25	5.65	4.40	5.10	6.85	4.40	5.00	6.25
Buffalo (country)	4.30	...	5.05[5]	5.50	...	4.70	5.50	4.25	4.95	6.85	4.25	4.45	5.75
Pittsburgh (city)	4.25§§	...	5.10[8]†	5.65	6.90	4.35	5.35	4.40	5.10	6.85	4.40	4.60	5.90
Pittsburgh (country)	4.10§§	...	4.95[8]†	5.50	6.75	4.20	5.20	4.25	4.95	6.85	4.25	4.45	5.75
Cleveland (city)	4.45	5.50[8]	5.20[8]	5.81	7.06	4.55	5.35	4.40	5.10	7.16	4.70	4.60	6.20
Cleveland (country)	4.30	5.35[8]	5.05[8]	...	...	...	5.20	4.25	4.95	...	...	4.45	...
Cincinnati	4.56	...	5.22	5.77	...	4.77	...	4.78	5.49	...	4.82	4.98	6.47
Detroit	4.55	...	5.30	...	...	4.72	5.63	4.50	5.22	7.10	4.77	4.88	6.28
Indianapolis	4.55	5.32[8]	...	5.87	7.12	4.65	5.90	4.70‡‡	5.40	8.85	4.70	4.90	6.35
Chicago (city)	4.45	5.50[8]	5.20[8]	5.65	6.90	4.35	5.45	4.40	5.10	6.85[9]	4.40	4.60	6.05
Chicago (country)	4.30	5.35[8]	5.05[8]	5.50	6.75	4.20	5.30	4.25	4.95	6.85[9]	4.25	4.45	5.90
Milwaukee	4.65[8]	5.70[8]	5.40[8]	5.858	7.108	4.558	5.658	4.608	5.308	7.208[9]	4.608	4.808	6.258
St. Louis	4.78	5.83[8]	5.53[8]	6.02	7.27	4.68	5.82	4.73	5.47[12]	...	4.73	4.93	6.38
Birmingham (city)	4.45[20]§§	...	...	5.65	...	4.45[20]	...	4.40[20]	5.93[22]	...	4.40	4.65	6.86
Birmingham (country)	4.30[20]§§	...	...	5.50	...	4.30[20]	...	4.25[20]	...	...	4.25	4.50	...
New Orleans	4.98[20]**	...	6.29[18]	...	...	5.18[20]	...	5.13[20]††	6.29[11]	...	5.03[20]††	5.33[20]	7.29[20]
Omaha, Nebr.	5.462	...	...	6.712	8.012	5.362	...	5.412	6.112	7.562	5.412	5.612	7.062
Houston, Tex.	5.75	...	...	7.36	8.10	6.00	...	5.35	7.00[12]	...	5.85	5.85	6.50
Los Angeles (city)	5.75	7.75[8]	7.45[8]	7.40	8.80	6.05	8.70	5.50	7.35[22]	9.35[10]	5.35	5.55	7.65
Los Angeles (country)	5.60	7.60[8]	7.30[8]	7.25	8.65	5.90	8.55	5.35	7.20[1]	9.20[10]	5.20	5.40	7.50
San Francisco*	5.20[21]	6.65[5]	...	6.85[5]	7.75[5]	5.75[21]	8.70[15]	5.05[21]	7.00[12]	9.35	5.20[21]	5.30[21]	7.10[21]
Seattle, Tacoma, Wash.	5.30[17]§§	...	7.10[5]‡	6.95	...	5.60[17]	...	5.45[17]	7.45[19]	8.50[12]	5.25[17]	5.55[17]	7.65[17]
Portland, Oreg.	5.30[17]§§	...	7.10[5]‡	6.70	...	5.60[17]	...	5.45[17]	7.45[19]	...	5.25[17]	5.45[17]	7.55[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over, cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [15]—2000 lb and over; [17]—300 to 9999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [22]—500 to 1499 lb.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; ** as rolled; †† add 0.40 for sizes not rolled in Birmingham; ‡‡ add 15c for 100 lb for slow moving items; §§ 18 gage and heavier.

PRICES OF LEADING FERROALLOYS PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $47, Palmerton, Pa., $51, Pittsburgh. 16% to 19% Mn., $46, Palmerton, $50, Pittsburgh.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.). Carload, lump, bulk $145 per gross ton of alloy, carload packed $157, ton lot $172, less ton $189; fob New Orleans, Mobile, Philadelphia, Baltimore, or New York. Carload, lump, bulk $151, fob cars Pittsburgh, including 50c switching charge. Add, or subtract, $1.80 for each 1%, or fraction thereof, of contained manganese over 82% or under 78%. **West Coast Prices:** Carload (80,000 lb or more), lump, bulk, same price and basing points as above. All other prices for shipment from Pacific Coast warehouses, add $26.21 to above prices. Delivery is fob Portland, Los Angeles, South San Francisco, or Seattle warehouses, with railroad freight allowed on shipments of 25 gross tons or more.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Eastern Zone, carload, lump, bulk, max. 0.10% C, 22.5c per lb of contained Mn, carload packed 23.25c, ton lot 24.35c, less ton 25.55c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Eastern Zone, carload, lump, bulk 16.5c per lb of contained Mn, carload packed 17.25c, ton lot 18.35c, less ton 19.55c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Eastern Zone, carload, 2" x D, bulk 32c per lb of metal, carload packed 32.5c, ton lot 34c, less ton 36c; Central, add 1c for c.l. and 1.45c for l.c.l.; Western, add 1.45c for c.l. and 2.4c for l.c.l. Freight allowed. Spot, add 2c.

Silicomanganese: (Mn 65-70%). Eastern Zone, contract, lump, bulk, 1.50% C grade, 17-20% Si, 7.8c per lb of alloy, carload packed, 8.55c, ton lot 9.45c, less ton 10.45c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. For 2.0% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Eastern Zone, contract, c.l., lump, bulk 18.6c per lb of contained Cr, c.l., packed 19.5c, ton lot 20.65c, less ton 22.05c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Eastern Zone, contract, c.l., 8MxD, bulk 20.1c per lb of contained Cr, c.l., packed 21.0c, ton lot 22.35c, less ton 24.1c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Eastern Zone, contract, carload, lump, bulk, max. 0.03% C 28.5c per lb of contained Cr, 0.04% C 27.5c, 0.05% C 27.0c, 0.06% C 26.5c, 0.10% C 26.0c, 0.15% C 25.5c, 0.20% C 25.25c, 0.50% C 25.0c, 1% C 24.5c, 2% C 24.25c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%; Mn 4-6%, add C 1.25% max.). Eastern Zone, contract, carload, lump, bulk 25c per lb of contained chromium, carload, packed 26.1c, ton lot 27.3c, less ton 29.1c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 2c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 2c for each 0.25% of N above 0.75%.

Chromium Metal: (Mn. 97% Cr and 1% Fe). Eastern Zone, contract, carload, 1" x D, packed, max. 0.50% C grade, 93c per lb of contained chromium, ton lot 94.5c, less ton 97c; Central, add 1.5c for c.l. and 2.5c for l.c.l.; Western, add 2.75c for c.l. and 4.5c for l.c.l. Freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 9.3c per lb of contained Si, carload packed 10.9c, ton lot 12.35c, less ton 14.0c; Central, add 0.5c for c.l. and 1.25c for l.c.l.; Western, add 0.7c for c.l. and 1.8c for l.c.l. Freight allowed. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices

75% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 11.8c per lb of contained Si, carload packed 13.1c, ton lot 14.25c, less ton 15.5c; Central, add 0.3c for c.l. add 0.75c for l.c.l.; Western, add 1.05c for c.l. and 5c for l.c.l. Freight allowed. Spot, add 0.3c.

85% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 13.3c per lb of contained, Si, carload packed 14.55c, ton lot 15.55c, less ton 16.7c; Central, add 0.3c for c.l. and 0.7c for l.c.l.; Western, add 1.05c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk, 15c per lb of contained Si, carload packed 16.2c, ton lot 17.15c, less ton 18.2c; Central, add 0.3c for c.l. and 0.65c for l.c.l.; Western, add 1c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Over 97% Si and 1% max. Fe). Eastern Zone, c.l., lump, bulk, regular 17.3c per lb of Si, c.l. packed 18.5c, ton lot 19.4c, less ton 20.4c; Central, add 0.6c for c.l. and 2.25c for l.c.l.; Western, add 1.2c for c.l. and 4c for l.c.l. Add 1c for max. 0.20% calcium grade. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing over 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract basis fob Niagara Falls, N. Y., lump per lb c.l. 6.90c; ton lots packed, 7.40c; 200 to 1999 lb, 8.15c; smaller lots, 8.65c. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb of Cr). Eastern Zone, contract, carload, bulk, 12.5c per lb of briquet, carload packed 13.2c, ton lot 14.0c, less ton 14.9c; Central, add 0.25c for c.l. and 0.9c for l.c.l.; Western, add 0.35c for c.l. and 1.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Eastern Zone, contract, carload, bulk, 8.7c per lb of briquet, c.l. packaged 9.5c, ton lot 10.3c, less ton 11.2c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Eastern Zone, contract, c.l. bulk 8.75c per lb of briquet, c.l. packed 9.55c, ton lot 10.35c, less ton 11.25c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Eastern Zone, contract, carload, bulk 5.1c per lb of briquet, c.l. packed 5.25c, ton lot 6.7c, less ton 7.6c. **(Small size**—weighing approx. 2½ lb and containing exactly 1 lb of Si). Eastern Zone, carload, bulk 5.25c, c.l. packed 6.05c, ton lot 6.85c, less ton 7.75c; Central, add 0.25c for c.l. and 0.6c for l.c.l.;Western, add 0.45c for c.l. and 0.9c for l.c.l. Freight allowed. Add 0.25c for notching, small size only. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Eastern Zone, contract, carload, lump, bulk 17.50c per lb of alloy, carload packed 19.0c, ton lot 19.8c, less ton 20.8c; Central, add 0.5c for c.l. and 0.85c for l.c.l.; Western, add 2.55c for c.l. and 2.6c for l.c.l. Freight allowed. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Eastern Zone, contract, carload, lump, bulk 16.25c per lb of alloy, carload packed 16.45c, ton lot 19.35c, less ton 20.85c; Central, add 0.5c for c.l. and 0.75c for l.c.l.; Western, add 2.55c for c.l. and 2.90c for l.c.l. Freight allowed. Spot, add 0.25c.

VANADIUM ALLOYS

Ferrovanadium: Open Hearth Grade (Va 50-55%, Si 8% max., C 3% max.). Eastern Zone, contract, any quantity, $2.90 per lb of contained Va; Central, add 2c for c.l. and 3c for l.c.l.; Western, add 6c for c.l. and 9c for l.c.l. Freight allowed. Spot, add 10c. **Special Grade** (Va 50-55%, Si 4% max., C 1% max.), $3. **High Speed Grade** (Va 50-55%, Si 1.50% max., C .20% max.), $3.10.

Vanadium Oxide: All Zones, contract, less carload lots, $1.20 per lb of contained V_2O_5. Spot, add 5c.

Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

TITANIUM ALLOYS

Ferrotitanium: (Ti 20-25%, Al 3% max., Si 4% max., C 0.10% max.). Eastern Zone, contract, ton lot, 2" x D, $1.35 per lb of contained Ti, less ton $1.40. (Ti 40-45%, Al 7% max., Si 4% max., C 0.10% max.). Ton lot $1.23, less ton $1.25; Central, add 4c for 20-25% Ti grade, and 2.1c for 40-45% grade; Western, add 13.5c for 20-25% Ti grade, and 7.2c for 40-45% grade. Freight allowed. Spot, add 5c.

Ferrotitanium, High-Carbon: (15-20%). Contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Eastern Zone, contract, 10,000 lb W or more, $2.25 per lb of contained W; 200 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Eastern Zone, contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Eastern Zone, contract, c.l., lump, bulk 6c per lb of alloy, c.l. packed 6.75c, ton lot 7.5c, less ton 8.35c; Central, add 0.25c for c.l. and 1.1c for l.c.l.; Western, add 0.6c for c.l. and 3.95c for l.c.l. Freight allowed. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Eastern Zone, contract, carload, lump, packed 18.4c per lb of alloy, ton lot 19.15c, less ton 20.40c; Central, add 0.6c for c.l. and 1.05c for l.c.l.; Western add 3.05c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Eastern Zone, contract, 100 lb or more. 1" x D, $1.20 per lb of alloy, freight allowed. Less than 100 lb $1.30; Central, add 0.75c; Western, add 2.9c, freight allowed. Spot, add 5c.

Borosil: (3 to 4% B, 40 to 45% Si). $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). **Net** ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Eastern Zone, contract, ton lot, 2" x D, $2.50 per lb of contained Cb, less ton $2.55; Central, add 1.65c; Western, add 6.45c. Freight allowed. Spot, add 10c.

CMSZ Mixes: No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Eastern Zone, carload, 12 M x D, carload packed 17.25c per lb of material, ton lot 18.00c, less ton 19.25c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Eastern Zone, carload, packed, 1" x D, 39c per lb of alloy, ton lot 41c, less ton 43c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Eastern Zone, contract, carload, packed, ½" x 12 M, 15.0c per lb of alloy, ton lot 15.75c, less ton 17.0c; Central add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed. Spot, add 0.25c.

Simanal: (Approx. 20% each Si, Mn, Al) Packed, lump, carload 10c, ton lots 10.25c, smaller lots 10.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Ferrophosphorus: 17-19% based on 18% P content with unitage of $3 for each 1% of P above or below the base) Gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferromolybdenum: (55-75%). Per lb, contained Mo. fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Metal Subsidy Proposal Meets Opposition

Tin control bill, however, is approved in committee. Copper stocks decline

NEW YORK — Consensus of opinion in Congress is that the copper-lead-zinc subsidy bill which was drafted recently in Denver by mining associations will not become law in its present form. The proposed measure would set up a system of payments for these three metals under brackets which range from 7 cents a pound for the first 250 tons of production to 1.5 cents for 1500 to 2000 tons. All production in excess of 2000 tons would receive 1.5 cents per pound "up to the minimum amount required to bring the operating margin of any mine operation to 15 per cent of the net proceeds at place of production from the sale of its ore or concentrates after payment of all treatment, transportation and marketing costs."

COPPER — Deliveries of copper to fabricators increased 5400 tons in January to a total of 118,855 tons, of which only 960 tons were furnished by the Office of Metals Reserve. Refinery stocks declined 4500 tons to a total of 71,533 tons as of Jan. 31. Crude copper production from primary and secondary sources rose to 82,516 tons from 80,954 tons in December. Refined copper output eased to 102,314 tons from 108,816 tons in December. Foreign stocks of refined copper declined 11,134 tons to a total of 132,845 tons as deliveries increased to 79,962 tons from 78,716 tons while production dropped to 79,907 tons from 87,318. Foreign production of crude copper eased to 102,261 tons from 105,105. The domestic market held steady last week but the export market was stronger with sales reported up to 21.87½c, fas New York.

BRASS, BRONZE INGOTS — Reflecting continued easiness in red metal scrap prices, the market for brass and bronze ingots declined further last week. At least one leading seller is now quoting 18.75c for No. 115 ingot, 18.25c for No. 120, 17.75c for No. 123, 21.50c for No. 245, 14.75c for No. 405, and 17.50c for No. 241.

LEAD — Demand continues in excess of supplies and sellers anticipate no letup in demand in the immediate future. Inquiry is active for both prompt and March shipment at the unchanged price level of 14.80 to 14.85c, St. Louis.

ZINC — While demand is not pressing, die casters, galvanizers and brass mills continue to take substantial tonnages at the 12-cent, East St. Louis, price level. Deliveries have been impeded recently by a shortage of box cars.

TIN — Bill to continue tin controls through June 30, 1949, was approved by the Senate Banking and Currency Committee last week. It provides the Department of Commerce with power to regulate the distribution and end-use of tin, tin products and antimony. Stocks of pig tin held by the Office of Metals Reserve amounted to 27,674 tons as of Jan. 31, representing an increase of 3119 tons during the month and more than 11,000 tons over the 16,356 tons on hand as of Sept. 30, 1947. Prices held firm here at 94.00c for Straits.

ALUMINUM — Total shipments of aluminum wrought products during 1947 amounted to 1407 million pounds, 23 per cent higher than the 1141 million pounds shipped during 1946, according to the Bureau of the Census. Of the 1947 total, 1111 million pounds, or 78 per cent, were plate, sheet and strip; 157 million pounds, or 11 per cent, were rolled structural shapes, bar, rod and wire; 122 million pounds, or 9 per cent, were extruded shapes, tube blooms, and tubing; and the remaining 17 million pounds were aluminum powder, flake and paste.

NONFERROUS METAL PRICES

Copper: Electrolytic, carloads 21.50c, delivered Conn.; Lake, 21.62½c del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c 1000-4999 lb; 1½c, 500-999 lb; 2c 0-499 lb. Casting, nom., refinery, 20,000 lb or more; nom., less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 18.75-19.25c; 88-10-2 (No. 215) 28.00c; 80-10-10 (No. 305) 24.25c; No. 1 yellow (No. 405) 14.75-16.00c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than carloads.

Zinc: Prime western 12.00c, brass special 12.25c, intermediate 12.50c, E. St. Louis; high grade 13.00c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 16.50-16.75; No. 12 foundry alloy (No. 2 grade) 16.25-16.75c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 16.50-17.00c; grade 2 (92-95%) 16.00-16.50c; grade 3 (90-92%) 15.75-16.00c; grade 4 (85-90%) 15.25-15.50c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, about 20 lb), 10,000 lb and over, 20.50c, fob Freeport, Tex.; 2000 to 9999 lb, 21.50c; 100 to 1999 lb, 22.50c. Extruded rounds, 12 inches long, 1.312 inches in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 to 4000 lb, 35.00-36.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (including Straits), 94.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 93.85c; Grade C, 99.65-99.79% incl. 93.50c; 99.00-99.64% 93.50c and 98.00-98.99%, 92.60c for tin content.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 33.00c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c, effective as of Mar. 15. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 224-999 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 33.75c lb; 25 lb pigs produced from electrolytic cathodes 35.25c lb; shot produced from electrolytic cathodes 36.25c lb; "F" nickel shots or ingots for addition to cast iron 34.25c lb. Prices include import duty.

Mercury: Open market, spot, New York, $77-$79 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $20.50 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.80.

Cobalt: 97-98%, $1.65 lb for 550 lb (keg) $1.67 lb for 100 lb (case); $1.72 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y., 74.62½c. per ounce.

Platinum: $69-$72 per ounce.

Palladium: $24 per troy ounce.

Iridium: $80-$95 per troy ounce.

Rolled, Drawn, Extruded Products

Copper and brass product prices are fob mill, with freight prepaid on 200 lb or more.

Sheet: Copper 33.68c; yellow brass 30.16c; commercial bronze, 95% 33.80c, 90% 33.27c; red brass, 85% 32.23c, 80% 31.70c; best quality 31.09c; Everdur, Duronze, Herculoy or equiv., hot-rolled, 38.56c; nickel silver, 18%, 42.42c; phosphor bronze, grade A, 5%, 52.70c.

Rods: Copper, hot rolled 30.03c, cold drawn 31.03c; yellow brass, free cutting, 24.69c; commercial bronze, 95% 33.49c, 90% 32.96c; red brass, 85% 31.92c, 80% 31.39c; best quality 30.78c.

Seamless Tubing: Copper 33.72c; yellow brass 32.92c; commercial bronze 90% 35.68c; red brass 85% 34.89c, 80% 34.36c; best quality brass 33.50c.

Wire: Yellow brass 30.45c; commercial bronze, 95% 34.09c, 90% 33.56c; red brass, 85% 32.52c, 80% 31.99c; best quality brass 31.38c.

Copper Wire: Bare, soft, fob eastern mills, carlots 26.80c, less carlots 27.30c; weatherproof, fob eastern mills, carlots 27.35c, less carlots 27.85c; magnet, delivered, carlots 29.75c-31.13c, 15,000 lb or more 30.00c-31.38c, less carlots 30.50c-31.88.

Aluminum Sheets and Circles: 2s and 3s flats, mill finish, base 30,000 lb or more, fob shipping point. Actual transportation charges (not to exceed lowest carload rail freight rate) are deducted on orders for domestic delivery of 500 lb or more of one product to one destination. Widths from 12 in. and diameters from 9 in. to indicated maximum sizes. Prices, cents per lb, effective Jan. 30, 1947.

B. & S. Gage	Max. Width or Diam.	Sheet Base	Circle Base
0.0249"-7	48"	23.70	26.20
8-10	48"	24.20	26.70
11-12	26"	24.70	27.50
13-14	26"	24.90	27.90
15-16	26"	25.10	28.20
17-18	26"	25.40	28.60
19-20	24"	25.70	29.00
21-22	24"	26.10	29.50
23-24	24"	26.60	30.20
25	24"	27.10	30.90
26	24"	27.80	31.90
27	24"	28.50	33.00
28	24"	29.20	33.70
29	24"	30.00	34.70
30	24"	30.80	35.80

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq ft; 75c, 10 to 20 sq ft and circles. Pipe: Full coils 17.50c; cut coils 17.75c. Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 16.50c-17.00c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 15.25c-16.00c, fob mill, 36,000 lb and over. Plates, not over 12-in., 14.25c; over 12-in., 15.25c.

Plating Materials

Chromic Acid: 99.75%, flake, fob Philadelphia, carloads, 22.00c; 5 tons and over 22.50c; 1 to 5 tons, 23.00c; less than 1 ton, 23.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 30.59c; oval, 30.09c; electrodeposited, 29.84c; cast, 29.59c.

Copper Carbonate: 52-54% metallic Cu; 50 lb bags, 25.00c fob Cleveland.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c fob Cleveland.

Sodium Cyanide: 96-98%, ½-oz ball, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 23.50c; 275-lb bbls, 21.50c.

Tin Anodes: Bar, 1000 lb and over 110.00c; 500 to 1000 lb, 110.50c; 200 to 5000 lb, 111.00c; less than 200 lb, 112.50c; ball, 1000 lb and over, 112.25c; 500 to 1000 lb, 112.75c; 200 to 500 lb, 113.25c; less than 200 lb, 114.75c, fob Sewaren, N. J.

Tin Chloride: Fob Grasselli, N. J., 625 lb bbls., price on application.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers and resellers, 67.4c; 100 or 300 lb drums only, 100 to 500 lb, to consumers 59.2c, to resellers 54.8c; 600 to 1900 lb, to consumers 56.8c, to resellers 52.5c; 2000 to 9900 lb, to consumers 55.0c, to resellers 50.9c; 10,000 lb or more l.c.l., to consumers 53.9c, to resellers 49.9c; carloads, to consumers 52.7c, to resellers 48.7c. Prices fob Sewaren, N. J.

Zinc Cyanide: 100-lb drums 36.00c, fob Cleveland; 35.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 21.50c, Conn., for copper)

Prices for less than 15,000 lb fob shipping point. Add ¾c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.625	15.375	14.750
Commercial Bronze			
95%	18.125	17.875	17.375
90%	17.625	17.375	16.875
Red brass			
85%	17.500	17.250	16.750
80%	17.250	17.000	16.500
Best Quality (71-79%)	16.625	16.375	15.875
Muntz Metal	14.750	14.500	14.000
Nickel silver, 5%	16.500	16.250	8.250
Phos. bronze, A. B.	20.750	20.500	19.500
Naval brass	15.250	15.000	14.500
Manganese bronze	15.250	15.000	14.375

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 17.50, No. 2 copper 16.50, light copper 15.50, composition red brass 14.50, auto radiators 11.00, heavy yellow brass 10.50, brass pipe 11.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 18.00, No. 2 copper 17.00, light copper, 16.00, refinery brass (60% copper), per dry copper content less $5 smelting charge for brass analyzing 60 per cent or more, 15.75.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 16.00-16.50, No. 2 15.00-15.50, light copper 14.00-14.25, No. 1 composition red brass 11.50-12.00, No. 1 composition turnings 11.00-11.50, mixed brass turnings 7.00-7.25, new brass clippings 12.50-13.00, No. 1 brass rod turnings 10.00-10.50, light brass 6.00-6.25, heavy yellow brass 8.25-8.50, new brass rod ends 10.50-11.00, auto radiators, unsweated 9.25-9.50, cocks and faucets 9.25-9.50, brass pipe 9.00-9.25.

Lead: Heavy 12.00-12.50, battery plates 7.25-7.50, linotype and stereotype 14.50-15.00, electrotype 12.00-12.50, mixed babbitt 13.50-14.00, solder joints 16.50-17.00.

Zinc: Old zinc 5.50-5.75; new die cast scrap 4.75-5.25, old die cast scrap 2.75-3.25.

Tin: No. 1 pewter 60.00-62.00, block tin pipe 77.00-78.00, auto babbitt 45.00-47.00, No. 1 babbitt 45.00-48.00, siphon tops 45.00-47.00.

Aluminum: Clippings, 2S 9.00-9.50, old sheets 7.00-7.50, crankcases 7.00-7.50, borings and turnings 2.50-3.00, pistons, free of struts, 6.00-6.50.

Nickel: Anodes 16.00-17.00, turnings 12.50-13.00, rod ends 16.00-17.00.

Monel: Clippings 12.00-12.50, turnings 7.00-7.25, old sheets 10.00-10.50, rods 10.00-10.50, castings 9.00.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Jan. 1-20	21.50	14.80–14.85	10.50	94.00	15.00	33.00	33.75	74.625
Jan. 21-31 ...	21.50	14.80–14.85	12.00	94.00	15.00	33.00	33.75	74.625
Feb. 2-19	21.50	14.80–14.85	12.00	94.00	15.00	33.00	33.75	74.625

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, fob Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$40.50
No. 2 Heavy Melt. Steel	40.50
No. 1 Busheling	40.50
Nos. 1, 2 and 3 Bundles	40.50
Machine Shop Turnings	36.50-37.00
Mixed Borings, Turnings	36.50-37.00
Short Shovel Turnings.	37.50-38.50
Cast Iron Borings	37.50-38.00
Bar Crops and Plate	47.50-48.00
Low Phos. Steel	47.50-48.00
Heavy Turnings	40.50-41.00

Cast Iron Grades

No. 1 Cupola	59.00-60.00
Charging Box Cast	45.00-47.00
Heavy Breakable Cast.	46.00-47.00
Unstripped Motor Blocks	52.00-53.00
Malleable	69.00-70.00
Brake Shoe	52.00-53.00
Clean Auto Cast	58.00-59.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	41.00-41.50
R.R. Malleable	75.00-80.00
Axles	51.50-52.00
Rails, Rerolling	54.00-55.00
Rails, Random Lengths	52.50-53.00
Rails, 3 ft and under	56.00-56.50
Rails, 18 in. and under	57.00-57.50
Railroad Specialties	55.00-56.00
Uncut Tires	52.00-52.50
Angles, Splice Bars	53.00-54.00

* Plus applicable freight springboard.

CLEVELAND

No. 1 Heavy Melt. Steel	$39.50-40.00*
No. 2 Heavy Melt. Steel	39.50-40.00*
No. 1 Busheling	39.50-40.00*
Nos. 1 & 2 Bundles	39.50-40.00*
Machine Shop Turnings	34.50-35.00
Mixed Borings, Turnings	34.00-36.00
Short Shovel Turnings.	35.50-36.00
Cast Iron Borings	35.50-36.00
Bar Crops and Plate	44.50-45.00
Punchings & Plate Scrap	44.50-45.00
Heavy Turnings	39.50-40.50
Alloy Free Turnings	37.50-38.50
Cut Structurals	52.00-53.00

* Plus applicable freight springboard.

Cast Iron Grades

No. 1 Cupola	70.00-72.00
Charging Box Cast	60.00-62.00
Stove Plate	60.00-62.00
Heavy Breakable Cast.	56.00-58.00
Unstripped Motor Blocks	60.00-62.00
Malleable	75.00-80.00
Brake Shoes	54.00-55.00
Clean Auto Cast	70.00-72.00
No. 1 Wheels	60.00-62.00
Burnt Cast	58.00-59.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50-41.50*
R.R. Malleable	75.00-80.00
Rails, Rerolling	60.00
Rails, Random Lengths	59.00-60.00
Rails, 3 ft and under	63.00-65.00
Cast Steel	58.00-60.00
Railroad Specialties	53.00-55.00
Uncut Tires	56.00-57.00
Angles, Splice Bars	61.00-62.00

* Plus applicable freight spring board.

VALLEY

No. 1 Heavy Melt. Steel	40.00-40.50*
No. 2 Heavy Melt. Steel	40.00-40.50*
No. 1 Bundles	40.00-40.50*
Machine Shop Turnings	34.50-35.50
Short Shovel Turnings.	36.50-37.00
Cast Iron Borings	36.00-36.50
Low Phos.	47.00-48.00

* Plus applicable freight springboard.

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50-41.50*

* Plus applicable freight spring board.

MANSFIELD

Machine Shop Turnings	$35.00-35.50
Short Shovel Turnings.	37.00-37.50

CINCINNATI

No. 1 Heavy Melt. Steel	$39.50
No. 2 Heavy Melt. Steel	39.50
No. 1 Busheling	39.50
No. 1 Bundles	39.50
No. 2 Bundles	39.50
Machine Shop Turnings	33.50
Mixed Borings, Turnings	32.50
Short Shovel Turnings.	35.50
Cast Iron Borings	34.50

Cast Iron Grades

No. 1 Cupola Cast	55.00
Charging Box Cast	43.00
Heavy Breakable Cast.	50.00
Stove Plate	47.00
Unstripped Motor Blocks	45.00
Brake Shoes	45.00
Clean Auto Cast	55.00
Drop Broken Cast	60.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	42.00
R.R. Malleable	68.00
Rails, Rerolling	58.00
Rails, Random Lengths	56.00
Rails, 18 in. and under	60.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$35.00-35.50
No. 1 Busheling	35.00-35.50
Nos. 1 & 2 Bundles	35.00-35.50
No. 3 Bundles	35.00-35.50
Machine Shop Turnings	29.00-29.50
Mixed Borings, Turnings	29.00-29.50
Short Shovel Turnings.	30.00-30.50
Cast Iron Borings	30.00-30.50
Punchings & Plate Scrap	40.00-40.50

Cast Iron Grades

No. 1 Cupola Cast	60.00-62.00
Heavy Breakable Cast.	50.00-52.00
Clean Auto Cast	62.00-65.00

BUFFALO

No. 1 Heavy Melt. Steel	$42.50-44.50
No. 2 Heavy Melt. Steel	39.75-40.25
No. 1 Busheling	39.75-40.25
No. 1 & 2 Bundles	39.75-40.25
Machine Shop Turnings	35.00-36.00
Mixed Borings, Turnings	35.50-36.00
Cast Iron Borings	36.50-37.00
Short Shovel Turnings.	36.50-37.00
Low Phos.	45.00-46.00

Cast Iron Grades

No. 1 Cupola	62.00-64.00
Mixed Cupola	60.00-62.00
Heavy Breakable Cast.	55.00-57.00
Malleable	70.00-75.00
Clean Auto Cast	62.00-64.00

Railroad Scrap

Rails, 3 ft. and under.	54.00-55.00
Railroad Specialties	55.00-56.00

PHILADELPHIA

No. 1 Hvy. Melt. Steel	$41.50-42.50*
No. 2 Hvy. Melt. Steel	39.00
No. 1 Busheling	39.00
No. 1, No. 2 Bundles	39.00
No. 3 Bundles	37.00
Machine Shop Turnings	34.00-35.00
Mixed Borings, Turnings	34.00-35.00
Short Shovel Turnings.	36.00
Bar Crop and Plate	46.50-47.00
Punchings & Plate Scrap	46.50-47.00
Cut Structurals	46.50-47.00
Elec. Furnace Bundles.	44.50-45.50
Heavy Turnings	43.00-44.00
No. 1 Chemical Borings	42.00-43.00

Cast Iron Grades

No. 1 Cupola Cast	62.00-63.00
No. 1 Machinery Cast.	65.00
Charging Box Cast	59.00
Heavy Breakable Cast.	59.00
Unstripped Motor Blocks	52.00-53.00
Malleable	74.00-76.00
Clean Auto Cast	62.00-63.00
No. 1 Wheels	64.00-65.00

* Nominal.

NEW YORK

(Brokers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$34.03
No. 2 Heavy Melt. Steel	34.03
No. 1 Busheling	34.03
Nos. 1 & 2 Bundles	34.03
No. 3 Bundles	32.03
Machine Shop Turnings	29.00-30.00
Mixed Borings, Turnings	29.00-30.00
Short Shovel Turnings.	30.50-31.00
Punchings & Plate Scrap	40.00
Cut Structurals	40.00
Elec. Furnace Bundles.	40.00

Cast Iron Grades

No. 1 Cupola Cast	55.00-58.00
Charging Box Cast	55.00-58.00
Heavy Breakable	55.00-58.00
Unstripped Motor Blocks	52.00-54.00
Malleable	65.00-68.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$31.40-31.90
No. 2 Heavy Melt. Steel	31.40-31.90
No. 1 Bundles	31.40-31.90
No. 1 Busheling	31.40-31.90
Machine Shop Turnings	29.00-31.00
Mixed Borings, Turnings	27.00-28.00
Short Shovel Turnings.	29.00-31.00
Bar Crops and Plate	36.00-38.00
Punchings & Plate Scrap	36.00-38.00
Chemical Borings	34.00-35.00

Cast Iron Grades

No. 1 Cupola Cast	60.00-65.00
Heavy Breakable Cast.	58.00-60.00
Stove Plate	55.00-57.00
Unstripped Motor Blocks	45.00-46.00
Clean Auto Cast	53.00-55.00

CHICAGO

No. 1 Heavy Melt. Steel	$39.00-39.50
No. 2 Heavy Melt. Steel	39.00-39.50
Nos. 1 & 2 Bundles	39.00-39.50
No. 3 Bundles	37.00-37.50
Machine Shop Turnings	34.00-34.50
Mixed Borings, Turnings	34.00-34.50
Short Shovel Turnings.	36.00-36.50
Cast Iron Borings	35.00-35.50
Bar Crops and Plate	46.50-47.00
Punchings	50.00-50.50
Elec. Furnace Bundles.	40.00-40.50
Heavy Turnings	38.50-39.00
Cut Structurals	44.00-44.50

Cast Iron Grades

No. 1 Cupola Cast	65.00-67.00
Clean Auto Cast	62.00-65.00
No. 1 Wheels	53.00-56.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	41.00-41.50
Malleable	70.00-71.00
Rails, Rerolling	49.50-50.00
Rails, Random Lengths	46.00-47.00
Rails, 3 ft and under.	55.00-56.00
Rails, 18 in. and under	57.00-58.00
Railroad Specialties	49.00-50.00
Angles, Splice Bars	53.00-54.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$39.50-40.50
No. 2 Heavy Melt. Steel	37.50-38.50
Machine Shop Turnings	32.50-33.50
Short Shovel Turnings.	34.50-35.50

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	60.00-65.00
Mixed Cast	60.00-62.00
Heavy Breakable Cast.	53.00-55.00
Brake Shoes	54.00-55.00
Clean Auto Cast	64.00-66.00
Burnt Cast	58.00-59.00

Railroad Scrap

R.R. Malleable	65.00-70.00
Rails, Rerolling	54.00-55.00
Rails, Random Lengths	52.00-53.00
Rails, 3 ft and under	57.00-60.00
Uncut Tires	46.00-47.00
Angles, Splice Bars	46.00-48.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$37.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	37.00
Nos. 1 & 2 Bundles	37.00
No. 3 Bundles	31.00
Long Turnings	24.50
Short Shovel Turnings.	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	38.50
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	51.00
Stove Plate	43.00
No. 1 Wheels	45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	45.00
Axles, Steel	39.00
Rails, Rerolling	52.00
Rails, Random Length.	39.00
Rails, 3 ft and under	41.00
Angles and Splice Bars	41.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$25.00
No. 2 Heavy Melt. Steel	*25.00
No. 1 Busheling	*25.00
Nos. 1 & 2 Bundles	*25.00
No. 3 Bundles	*20.00
Machine Shop Turnings	*15.50
Bar Crops and Plate	25.00
Cast Steel	25.00
Alloy Free Turnings	15.50
Cut Structurals	25.00
Tin Can Bundles	20.00

Railroad Scrap

No. 1 Heavy Melting	26.00
Axles	32.00
Rails, Random Lengths	26.50
Uncut Tires	33.50

*Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$24.00
No. 2 Heavy Melt. Steel	24.00
No. 1 Busheling	24.00
Nos. 1 & 2 Bundles	22.00
No. 3 Bundles	22.00
Machine Shop Turnings	14.50
Mixed Borings, Turnings	14.50
Punchings & Plate Scrap	24.50
Cut Structurals	24.50

Cast Iron Grades

No. 1 Cupola Cast	35.00
Charging Box Cast	25.00
Heavy Breakable Cast.	24.00
Stove Plate	25.50
Unstripped Motor Blocks	24.00
Malleable	30.00
Brake Shoes	30.00
Clean Auto Cast	30.00
No. 1 Wheels	26.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	22.00
Railroad Malleable	30.00
Rails, Random Lengths	21.50
Angles and Splice Bars	23.00

LOS ANGELES

No. 1 Heavy Melt. Steel	$25.00
No. 2 Heavy Melt. Steel	25.00
Nos. 1 & 2 Bundles	25.00
Machine Shop Turnings	16.00
Mixed Borings, Turnings	15.50-16.00
Punchings & Plate Scrap	28.00
Elec. Furnace Bundles.	28.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00

HAMILTON, ONT.

(Ceiling prices, delivered)

Heavy Melting	$22.00
No. 1 Bundles	22.00
Mechanical Bundles	20.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	23.00
Rails, Rerolling	26.00
Bushelings	17.00
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	42.00-43.00
No. 2 Cast	35.00-37.00

* Removed from price control Aug. 9, 1947; quoted on basis of fob shipping point.

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Semifinished Steel Prices Rise

Shift to net ton basis for quoting carbon steel products and adjustments in extras results in estimated increase of about $6 per ton

Pittsburgh — Leading producers of carbon semifinished steel have revised method of pricing from a gross to a net ton basis, resulting in an estimated increase of between 11 and 12 per cent. With accompanying adjustments in extras the net increase is estimated at about $6 per ton. Similar action is expected on alloy semifinished steel. Electric furnace carbon semifinished items, with exception of tube rounds, and billets under 4 by 4-inch, are still sold on a gross ton basis.

Change-over to the net ton procedure of quoting carbon semifinished steel has been sought for years by steel interests to facilitate preparation of statistical and accounting records of internal operations. However, some complications might develop due to fact railroad freight rates still are set up on gross ton basis for semifinished steel, which not only brings up possibility of upward revision in these rail charges but also would appear to necessitate additional calculations in arriving at delivered semifinished steel prices.

Steel producers also point out that the price relationships between semifinished and finished steel have in recent years been distorted as result of larger percentage advances in latter items. Switch to net ton basis of quoting semifinished has rectified this unbalanced price situation somewhat. Recent increases in fuel oil prices, inbound freight rates, etc., are additional factors forcing producers to raise prices.

On a revised basis, carbon forging ingots are sold at $46 per net ton, rerolling ingots continue on a negotiated price basis; rerolling billets, blooms and slabs, $45 to $47; forging quality billets, blooms and slabs, $54; and tube rounds, $69 to $70 per net ton. One producer increased skelp $6 a ton to $2.90 per 100-pound base, with other interests going up $5 to same price base. On all of the above items, including sheet bars, substantially higher price levels are noted in open market transactions.

In addition to revising the base prices of semifinished steel, the applicable extras also have been adjusted to a net ton basis. Increase in extras on rerolling billets, only within the smaller size ranges, have been put into effect by at least one producer, as follows: For 1-1/2 to 1-3/4-inch billets, the new size extra is $5 per net ton against former extra of $3 per gross ton; over 1-3/4 to 4-inch exclusive, the new extra is $4 per net ton against $2 per gross ton formerly; from 4 to 6-inch exclusive, the extra is $3 on net ton basis against $1 per gross ton formerly. These extras apply to slabs of equivalent cross sectional area.

One hot and cold-rolled strip producer, dependent on an outside source for its billets, estimates the billet price revisions represent an average increase of $7.50 per ton. One producer has raised its hot and cold-rolled strip prices $10 a ton to offset the higher billet prices and other raw material and production costs.

Steel Bars . . .

Bar Prices, Page 138

New York—Cold finished carbon bars are in somewhat tighter supply, particularly on flats and special sections. These special sections represent but a relatively small portion of tonnage to be rolled; nevertheless, some cold drawers are now sold out on these sections for the remainder of the year. Cold drawers have been booking such future tonnages as prove of interest, rather than selling on a quarterly basis as has been the general rule in hot carbon bars. Hot and cold alloy bars are available for shipment within a few weeks but with a slightly tighter situation in hot alloys. One producer, for instance, is no longer accepting orders for hot alloy bars where it is definitely indicated that the buyers are placing the tonnage as a substitute for hot carbon bars and will switch back to the latter as soon as the stringency is relieved.

One leading seller of hot carbon bars reports that his customers generally will receive 10 to 15 per cent less tonnage than otherwise because of a heavier diversion of shipments to car builders.

Boston—To increase volume to the manufacturing trade, some bar producers are not booking, or have drastically reduced, acceptance of orders from warehouses for one-half inch and smaller hot-rolled bars for second quarter delivery. To some degree this also applies to flats and other scarce sizes and grades. Cold-finished stock and alloys are somewhat more extended as to delivery, one week or 10 days. Part of the recent improvement in alloy buying is attributed to substituting for carbon, but most producers are discouraging use of alloys for carbon on this basis. Consumers of cold-finished have balanced stocks in most sizes and the pressure on that grade is gradually easing.

Philadelphia — While most producers of hot carbon bars have set up quotas for second quarter with at least two still working on their allotments, recent operations have been so disrupted by winter conditions that they have had difficulty setting up their figures. Indications point to some easing in stringency in the second quarter. Leading Philadelphia jobbers assert that February business on a daily basis will probably ease tonnagewise, although increase dollarwise.

Pittsburgh—Demand for alloy bars has increased sharply during the last few weeks, due to one or a combination of the following factors: Threat of a coal strike disrupting bar production schedules; prospect of reduction in mill allotments under the forthcoming voluntary allocation program to supply "preferred" domestic industries and for export needs under the Marshall Plan; possible increases in prices; fact that some companies have discontinued producing alloy bars; and likelihood that many customers have worked off top-heavy inventories. Order backlogs for alloy bars are extended into May and June, with spring flats and small sizes most extended. Around the close of last year many alloy bar sizes were available from stock. Carbon bar interests report production schedules were reduced up to 50 per cent early last week because of the industrial gas shortage, necessitating a corresponding revision on second quarter allotments.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 138

Chicago — Reinforcing steel suppliers show little interest in new inquries, reporting that on the basis of steel available they are already overcommitted. Invitations for bids on large tonnages frequently go begging and from time to time large building projects are postponed when it becomes obvious that steel cannot be procured. Failing to contract for total requirements on large projects which are to go ahead, contractors frequently break the tonnage into small parcels and acquire enough to keep the jobs progressing. As is to be expected at this season of year, there are numerous public works jobs, such as roads, bridges, waterworks, buildings, and the like.

Philadelphia — Reinforcing bar demand is featured by requirements for two veterans hospitals, one in Wilkes-Barre, Pa., requiring 1900 tons, the other in Wilmington, Del., requiring 1300 tons of bars and 350 tons of shapes. General contractors bidding was close on both projects, with Merritt-Chapman & Scott Corp., New York, low on the first project and Virginia Engineering Co., Newport News, Va., low on the second.

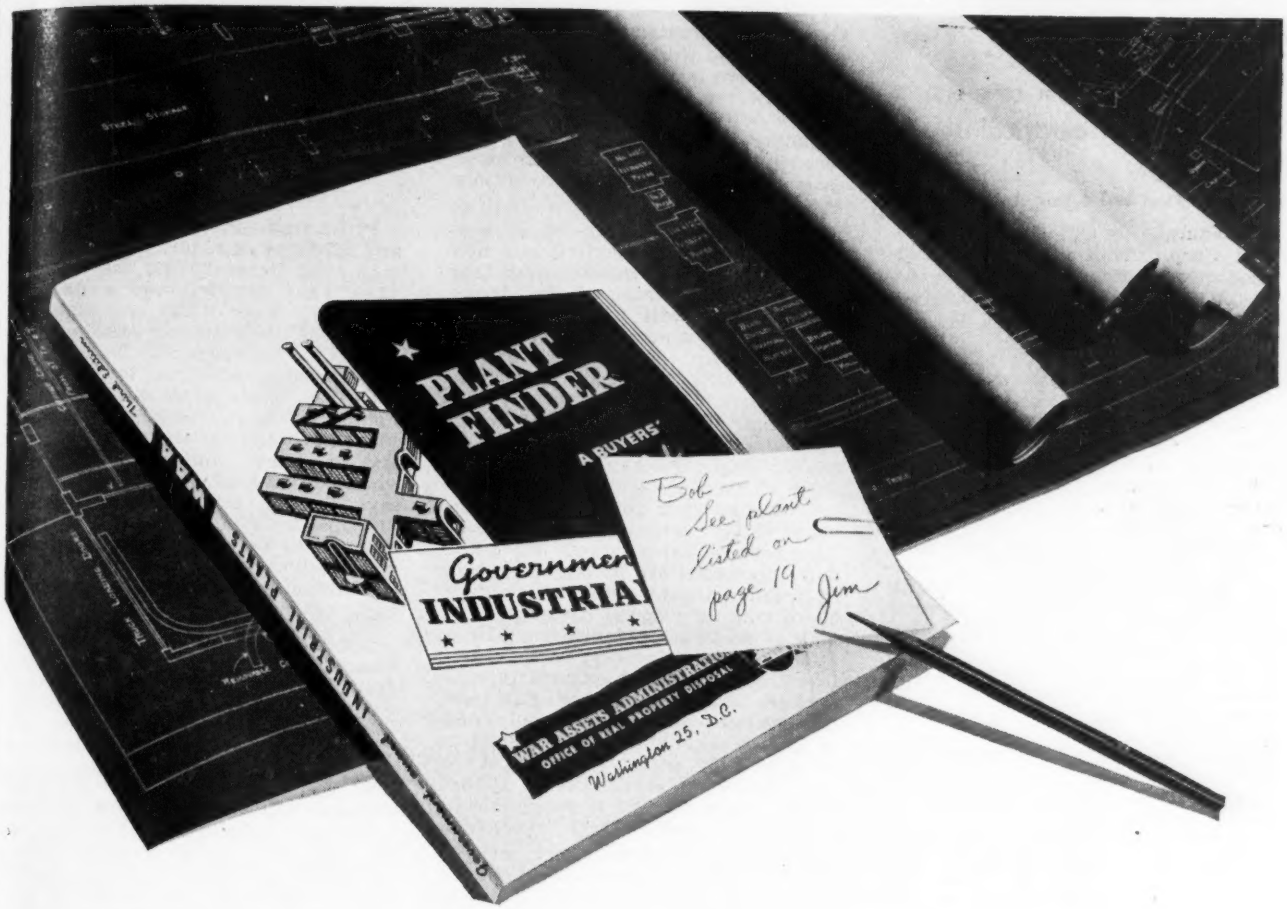
New York — Reinforcing bar demand is featured by an inquiry for superstructure steel for the municipal housing development, Astoria, Long Island. The development will comprise 10 buildings, with a sizable tonnage of bars involved.

Tin Plate . . .

Tin Plate Prices, Page 139

Pittsburgh — Pending limitations on use of tin plate for beer, oil and coffee containers are expected to necessitate shifts from hot-dipped to electrolytic, and from electrolytic to bonderized and can-making quality black plate. It appears to be a foregone conclusion that pig tin controls will be extended, particularly since the Senate Banking & Currency Committee recently approved a bill to continue the government power to control the distribution and use of tin through June 30, 1949.

In future the coils for tin plate produced at Jones & Laughlin's Pittsburgh plant will be cooled on a new hot coil conveyor about 800 ft long before shipment in the hot-rolled condition to the company's new high-speed, cold-reduction tin mill at Aliquippa, Pa.



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Sheets, Strip . . .

Allegheny Ludlum raises strip $10 a ton; electrical sheets $15-$25

Sheet Prices, Page 138

Pittsburgh — Allegheny Ludlum Steel Corp. advanced hot and cold-rolled carbon strip prices $10 a ton, effective Feb. 20, to offset an average increase of $7.50 per ton in the cost of billets purchased from outside sources and advances in other raw material and production costs.

This same interest raised prices of electrical sheets on Feb. 19 as follows: Intermediate, $15 a ton; transformer C, $20; transformer A and B, $25. The company is not producing other electrical sheet grades for general ditribution.

Sheet and strip sellers report little, if any, change in the pattern of overall demand. Openings on rolling schedules that occasionally develop are quickly filled and there is no let-up in pressure for prompt delivery on the part of most customers. Operating schedules were well sustained during the recent period of industrial gas shortage.

Flat-rolled products constitute bulk of the 35,500 tons of steel the industry is scheduling for shipment to Greece and Iceland.

Boston — Flat-rolled steel order backlogs have slight relation to actual demand for these products; booked tonnage is arbitrarily fixed by allocations and geographical factors in distribution. If all orders for flat-rolled were accepted, confusion would be even more rampant. For carbon sheets, second quarter quotas preclude much chance for heavier volume; tonnage for warehouses, after several whittlings of allocations, will not be much over 30 per cent of original quotas. While there is nothing definite, some slight improvement in galvanized and silicon may be forthcoming. To clean up carryovers, something producers have been attempting for months, four to six weeks will come out of second quarter. Narrow cold strip producers are practically scheduled for second quarter with ultimate commitments dependent on hot strip supply of cold reduction. Confronted with this high level demand for flat-rolled, producers visualize scattered instances where consumer goods users might ease pressure; the shoe industry is a substantial consumer of steel in New England and one of the largest users is not pressing for full allocations covering second quarter. This may be due in part to better rounded inventories, but the shoe trade in this immediate district is definitely off.

New York—While sheet producers generally have been experiencing considerable operating difficulties, due primarily to shortage of gas, practically all now have set up consumer quotas on shipments after Mar. 31. In some instances quotas have only been established for the first month of the second quarter and with most of that tonnage representing arrearages; others have set them up for the entire three months, although admitting that some revisions may be necessary later, especially should the voluntary allocation program become worked out sufficiently soon to have influence. Most consumers, however, appear to stand a chance of getting as much tonnage, including arrearages, as they are now receiving and possibly a little more, as more favorable weather conditions should step up production.

Philadelphia — While sheet consumers are being promised less new tonnage for second quarter than they were at the beginning of the current quarter, they will probably receive more tonnage against these promises than they are receiving and in any event probably will receive more overall tonnage, including arrearages due.

Chicago—Reactions in the commodity and stock markets recently did not lessen demand for sheets and strip. Consumers are pressing as insistently as ever for increased tonnages and early shipments; there have been no cancellations. More and more numerous are becoming reports of manufacturers forced to reduce operations or suspend altogether for lack of material to fabricate. Easing in sheets and strip likely would manifest itself in lessened demand for conversion material and there has been no development here. The only mill in this district which has engaged in conversion is constantly turning down new business despite the fact that most consumers find it impossible to locate semifinished steel to convert.

Cincinnati—District sheet mills have restored rolling operations to feasible capacity in efforts to make up for loss of tonnage during the period of gas curtailment. It is apparent, however, that the lowered output will be reflected in the carryover, and the allotments for next quarter. Current demand indicates no easing in the tight sheet supply into the third quarter.

St. Louis—Stringent sheet demand is picking up a little as fabricators seek to prepare for spring manufacturing increases. Mills now predict a sustained peak demand at least until late 1949 and capacity operations for two to three years. Granite City Steel Co.'s new cold rolling mill has been speeded up to 40 per cent of capacity. Since discontinuance of hot-rolled sheet and plate production, the firm is aiming at one-third permanent division between cold-rolled sheet, roofing and tinplate output. All but five of its 13 open hearths have been shut down due to scrap and fuel shortages. Scrap and pig iron now are adequate, but more hearths will not be added until finishing equipment is operating at capacity. Order books will remain closed until that capacity date is in sight. Unusual pressure for export steel is being felt in this district, although normally that demand is confined nearer seaboards. An estimated 2½ per cent of finished tonnage here is going to export, with little prospect for increase.

Birmingham — Result of moderation in the weather and restoration of industrial gas has served only to intensify demand for sheets. Not much sheet tonnage was lost in steel mill schedules, but shortage of gas did hit processors rather hard with the result that some easing was momentarily noted. In neither case, however, was there sufficient sheets to supply needs.

Tubular Goods . . .

Prices of pipe and tubing items advance up to $12 a ton

Tubular Goods Prices, Page 139

Pittsburgh—Price advances in pipe and tubing items, put into effect by major producers during the last ten days, have not followed a uniform pattern. More than one interest raised oil well tubing substantially more than the $9 a ton increase recently made effective by National Tube Co., while some variations are noted in size classification range break in prices on seamless standard and line pipe. Some producers, for example, have advanced oil well tubing $20 per ton for 2-inch O.D.; $15 for 2-1/2-inch; $10 for 3-inch; other sizes $9. For seamless standard and line pipe some interests have established a price break under 8-5/8-inch, other at 8-5/8-inch and under.

Jones & Laughlin Steel Corp. advanced prices on pipe and tubing from $6 to $10 a net ton; National Supply Co., $6 to $12; and Wheeling Steel Corp., $3 to $12, effective Feb. 13. National Tube Co. raised its prices as follows: All classes of oil well casing under 8⅝-in. O.D., no change; 8⅝ to 13⅜-in., up $6; over 14-in., no change; oil well tubing, up $9; drill pipe, up $6; seamless standard and line pipe under 8⅝-in., up $9; 8⅝-in. and larger, up $6; black butt weld, ½ to 3-in. O.D., up $7; galvanized butt weld, ½ to 3-in., and all galvanized pipe, up $10. Carbon tubing specialties advanced an average of $9 a ton. Hot-rolled carbon boiler tubes were increased 7 per cent; cold-drawn, 5 per cent. Hot-rolled and cold-drawn carbon mechanical tubing (sec. D) advanced 5 per cent; carbon mechanical auto tubing (sec. G), up 6 per cent; carbon coupling stock (sec. H), up 7 per cent. Carbon working barrel tube (cold-drawn only) advanced 5 per cent; carbon precision pump tubes and similar types, up 5 per cent; carbon mechanical special shapes, such as squares, etc., up 5 per cent.

A. M. Byers Co., Pittsburgh, advanced wrought iron pipe prices $8 per net ton, effective as of Feb. 20. The company also advanced galvanized pipe from $4 to $6 a ton. Previously, as of Feb. 9, the company had advanced galvanized pipe $1 a ton on 3/4-inch and smaller and $3 a ton on 1-inch and over.

New York — Bethlehem Steel Co. has advanced prices on butt and lap weld steel pipe. The base sizes of butt weld, 1/2 to 3 inches, have been increased $7 a ton on black and $10 on galvanized. The base sizes of lap weld pipe, 3-1/2 to 6 inches, have been advanced $9 a ton on black and $12 on galvanized. This follows similar action by other leading producers recently.

Cleveland — Republic Steel Corp., Cleveland, announced price increases effective Feb. 16 of from approximately $6 to $9 a ton on black pipe. In addition to these, there was a $3 a ton increase on galvanized pipe effective Jan. 30. Last previous in-

the Corporation President

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T. M. Stanton* was having a nightmare. For months he'd been preoccupied with the production problems of Empire Gadgets, Inc. So preoccupied, he'd even half-admitted to himself that he was devoting far less thought to national problems than a leading citizen should. But the urgency of his immediate interests kept shoving these concerns into his subconscious mind. Now they were torturing his sleep.

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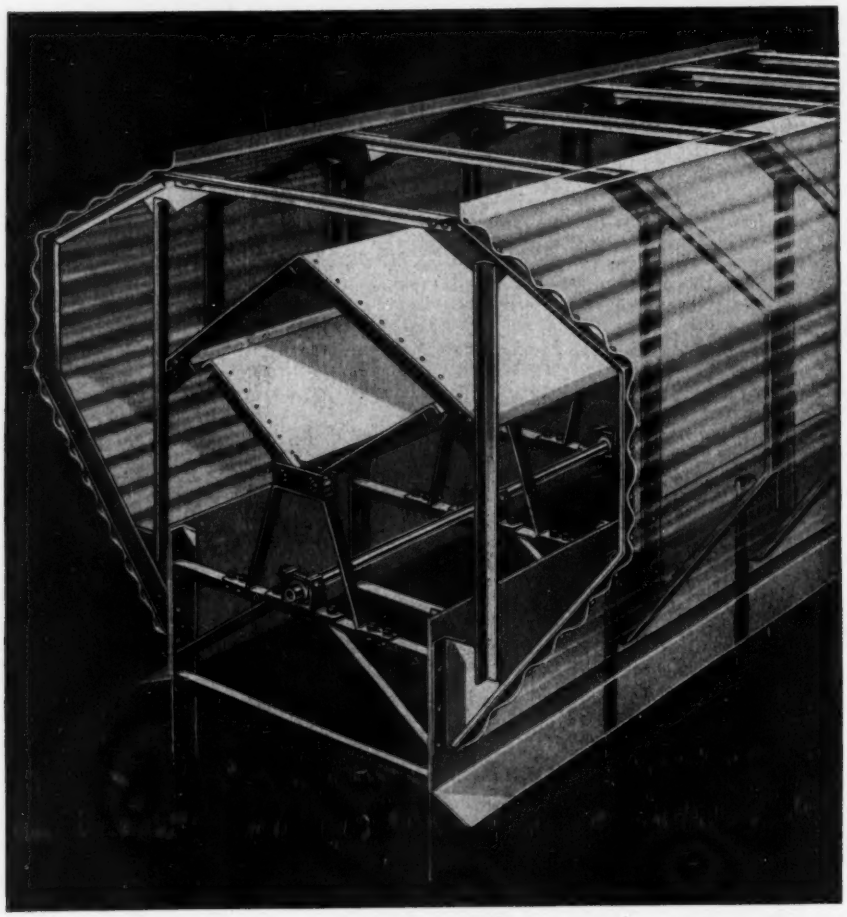

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crease in the company's pipe prices occurred July 29, 1947.

The latest increases and the percentage points by which they reduce discounts on pipe prices are: Butt-weld, ½-in. to 3-in., inclusive, 3½ points; electric-weld standard and line, 2-in. to 6-in., inclusive, 4½ points; electric-weld standard and line, 8-in. to 12-in., inclusive, 3 points; plain and electric-weld line, 2⅜-in. O.D. to 6⅝-in. O.D., inclusive, 4½ points; plain and electric-weld line, 8⅝-in. O.D. and larger, 3 points; waterwell casing, 3¼-in. to 6¼-in., inclusive, 4½ points; waterwell casing, 8¼-in., 3 points. Oil country casing and drive pipe smaller than 8⅝-in. O.D., increased $9 a ton; and 8⅝-in. O.D. to 13⅜-in. O.D., inclusive, increased $6 a ton.

St. Louis — Merchant pipe prices were scheduled to go up here last week with increases ranging from $3 on small black to $10 on 3-inch galvanized. Boost was attributed to recent high scrap costs. Pipe now is acutely scarce and expected to become worse in the spring when the building season opens. During the winter plumbing repairs maintained an unusually heavy drain on pipe supplies. Local pipe output is crowding 100 per cent of capacity.

Plates . . .

Plate Prices, Page 139

Boston — While plate fabricators look for slightly more tonnage next quarter, some of it included in carryovers, second quarter allotments are no heavier and in some cases actually lower due to recent production losses which has necessitated rescheduling. Warehouses are existing mostly on odds and ends, the limited volume requiring an excessive amount of shearing and handling. Plate shipments have been averaging close to 10 per cent of total steel shipments and production last year was about 2.2 million tons over 1946, but there is no easing in the supply. Shipments in the latter year totaled 8.5 per cent of all steel shipped.

With shipbuilding requirements down sharply, volume in floor plates is surprisingly heavy, maintaining a trend which started soon after the war. Substituting for universal and sheared plates may account for some of this sustained demand, but only to a slight degree as most producers discourage use of a substitute. General opinion is floor plates have entered a broader field of legitimate application which is reflected in not only a heavy mill demand, but also with warehouse. Bookings in same cases have extended to May deliveries.

New York — Plate supply is as stringent as ever. Although sellers have been endeavoring to catch up on arrearages by turning down considerable tonnage, they will continue to have fairly substantial carryovers at the end of this quarter. The mills have not been able to make the headway they had hoped for. They are lookng now for some gains in the second quarter, when weather conditions will be better and when there should be a better flow of scrap.

Pittsburgh — An increasing proportion of plate tonnage output is being directed to pipe mills. Some producers are expected to soon revise size extras on light gage plates under

1/4-inch as well as width extras. Output of both plates and structural shapes were hard hit during the recent period of industrial gas shortage. Supply-demand situation in plates is just as critical as in sheets. Still further tightening in supply is indicated through the second quarter, reflecting increased commitments for railroad car construction and other programs.

Philadelphia — District plate operations are slightly better, as a result of a better flow of scrap and an improvement in fuel oil and gas supplies. With the winter season now on its last lap, better average operations are expected to be maintained. Most producers, however, will go into the next quarter with substantial arrearages.

Birmingham — Plate producers report demand continues heavy. Exact figures on allocation of plates to Republic's tube mill at Gadsden have not been disclosed, but the tightness becomes more apparent. Scattered plate tonnage continues to move into the district from elsewhere, most of it in small lots.

One eastern producer last week advanced carbon steel plates from $63 to $69 a ton, $6 increase.

Structural Shapes . . .

Leading producers revise extra cards on hot-rolled carbon steel shapes

Structural Shape Prices, Page 139

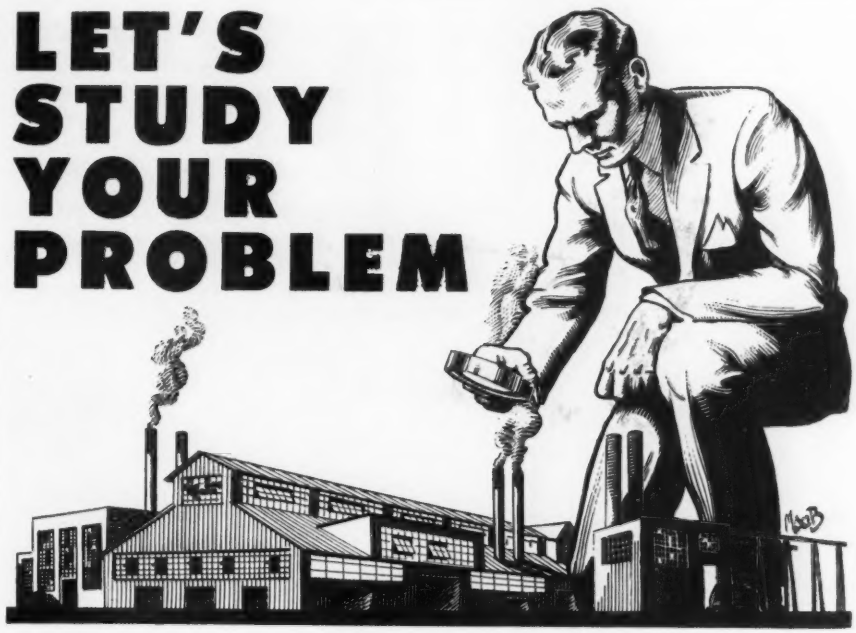
Pittsburgh—Carnegie-Illinois Steel Corp. revised its extra card on hot-rolled carbon steel shapes, effective Feb. 12; other interests are reported to have followed. The increase in some size extras ranges from $1 to $9 a ton, others are unchanged or slightly reduced. The increase in extras is estimated to average $3.50 per ton.

The extra card has been revised as follows: There are no longer base sizes for standard beams, standard channels and standard car and shipbuilding channels. Base sizes for angles have been reduced to 3 x 3 inches, 3 x 2½ inches and 3 x 2 inches. Formerly there was an extra of $2 per ton for these sizes, the base being between 4 to 6 inches. Size and section extras on standard angles have been increased from $1 to $2 per ton, while the extras for the exceptions to the standard sections have been increased from $1 to $7, with some remaining unchanged or even reduced.

Every standard beam now takes an extra; formerly 7 to 15 inches, inclusive, was considered base size. The new extra card shows size extras for 3-inch standard beam 60 cents per 100 pounds; 4-inch, 40-cents; 5 and 6-inch, 30 cents; 8-inch, 25 cents; 15-inch, 20 cents; and 10-inch, 15 cents. Advances range from $1 to $9 a ton.

Size and section extras for wide flange beams have been increased $2 to $7 a ton, although some sections, such as CB-183 and 182 are unchanged at 20 cents.

Wide flange bearing pile size extras have been increased $5 a ton; light beams, $6 to $8; joists, $7 to



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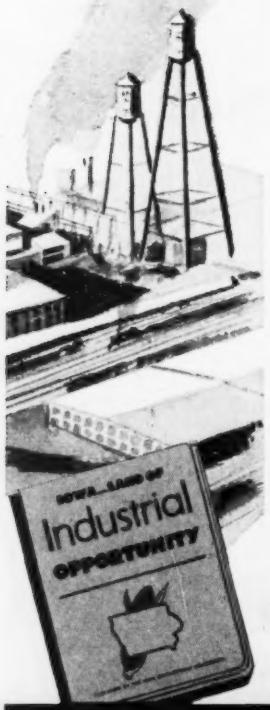

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$10; and stanchions advanced $10 a ton.

Size and section extras for H-beams have been increased $6 a ton and there is some prospect of a further increase in the near future. As in the case of standard beams, all standard channels now take an extra. Formerly 9 to 15-inch inclusive standard channels was considered base; the extras for these sizes now range between 20 and 30 cents per 100 pounds. Extras for standard car and shipbuilding channels have been similarly established. Size extras for special carbuilding sections have been advanced $2 to $6.

Size extras for rolled Tees are up $4 to $9 a ton, and standard Zees up from $2 to $4.

There are expected to be some minor adjustments in other structural shape extras, affecting splitting, milling, cambering, and revision in the wording under "Restricted Chemical Requirement Extras."

Philadelphia — Considerable structural work is still being figured by eastern fabricators. Nevertheless, volume is being adversely affected by mounting construction costs and, to some extent, seasonal influences. With leading fabricators booked four to six months ahead, some projects are being held up because they would be started too late for major completion before winter. However, the particular deterrent is costs. Some jobs have been indefinitely postponed because costs have so far exceeded appropriations. Delay is less apparent in public construction but it is noticeable in private work, particularly noncommercial projects, such as hospitals, colleges and churches. Veterans' hospitals, for which public funds are available, are going ahead, but this in general is not the case with private hospitals. Moreover, the recent break in the commodites market has had a somewhat sobering effect, giving rise to the possibility that perhaps within a few months from now there may be a turn in building cost trends. However, ever since the break in commodities, the leading producer of shapes has advanced extras, which fabricators estimate will add anywhere from $3.50 to $5 a ton to the cost of steel. Other producers will likely follow.

Boston — While railroad car building requirements will limit any material improvement in structural tonnage to fabricators in second quarter, the latter are able to meet backlogs and commitments under allocations, subject to some delays on scattered sizes and fill-ins. Structural volume to warehouses is restricted and distributor inventories are low and out of balance. Aggregate inquiry for fabricated structural steel shows a mild seasonal improvement, but backlogs with larger shops operate against wanted deliveries in most cases.

Chicago — New inquiry for fabricated structural steel is of only moderate volume, a condition which is considered fortunate in view of the fact that plain shapes are in short supply. Much of the new business booked by fabricators comes from customers of long standing. Orders on books will keep them occupied for at least six months based on current receipts of material from mills. Some of the fear previously expressed over allocation programs for essential industries appears to be passing away.

Pig Iron . . .

Pig Iron Prices, Page 140

New York — Pig iron shipments are still coming through slowly, although some consumers now believe that their daily average receipts will be comparable to those in January. They report also a little betterment in scrap supply and estimate that on the whole they will be able to sustain their melt at the reduced rate of recent weeks. Most consumers are concerned about the possible effects of the proposed voluntary allocation program, but admit that the situation has not become sufficiently clarified for them to know where they stand. So far only one of the five groups usually mentioned as likely to receive preference under the plan has indicated what it will need. This is the carbuilding group and there has been no definite decision with respect to what it will receive; producers assert that requirements have been set too high.

Boston—Limited pig iron supply is contributing to rampaging prices for cast scrap, but no general improvement in the former is in sight with New England melters dependent largely on Mystic production. The Everett furnace is experiencing difficulty in attaining full capacity of roughly 550 tons daily. Shipments of iron are improving, but basic users are operating with dangerously low reserves. At $45 furnace, consumers of foundry iron are getting material at a lower cost than would be the case on delivered iron from Buffalo or Pennsylvania, but this is offset by current cast scrap levels. At the time contracts were made for Everett production $45 looked high, but subsequent events have demonstrated otherwise. Part of the basic used in this area is tied to heavy melting steel scrap prices at Buffalo and to the extent price for the latter appears to have stabilized at the lower formula level cost of iron is temporarily steadier.

Philadelphia — While foundry pig iron supply has seldom, if ever, appeared tighter than at present, indications are that within the next several weeks some improvement will be noted, due primarily to the likelihood of a freer movement in scrap. Steel scrap is already coming out somewhat more freely and with continued improvement in weather more scrap can be substituted by the steel mills for pig iron thus making more available for the foundries. Once this turn definitely comes, the expectation is that cast scrap will undergo a decline in price. Meanwhile, foundries are experiencing considerable difficulty in getting coke. Heavy requirements for gas recently have cut sharply into the local supply for metallurgical purposes, with oven, as well as beehive, being drawn upon from distant points. Some coke from the Ford ovens has been coming into this district, and some coke from Ashland, Ky.

With one pipe foundry down for two weeks or so, due principally to shortage of pig iron, the foundry melt in this district this month will probably be off on a daily basis from January.

Pittsburgh — Foundry operations continue limited by the availability of pig iron, coke and scrap. Suppliers of these basic raw materials believe

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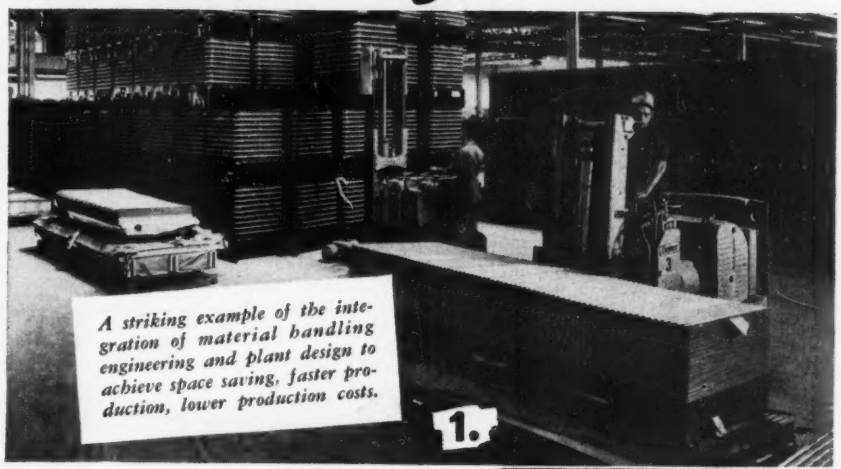

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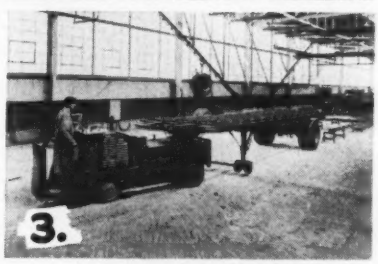

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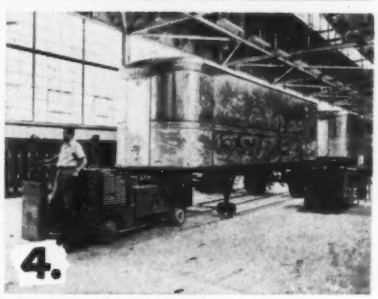

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the supply situation will not record significant improvement through most of this year. Easing in the industrial gas supply has enabled some foundries to increase output slightly. Jones & Laughlin Steel Corp. recently was forced to blow out its No. 4 furnace at Aliquippa for 10 days to make minor repairs. This interest has an extensive long-range blast furnace relining program under way.

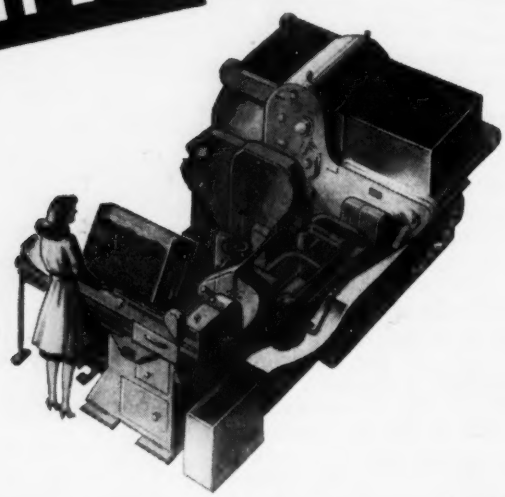
Buffalo—Many foundries curtailed or temporarily suspended operations during the week as the pig iron situation became even more desperate. Rail embargoes delayed shipments to foundries. Coke receipts were affected also, leaving some producers with inadequate supplies which in turn pared blast furnace operations. While drastic slashes in melt had been centered heretofore among distant buyers, the recent blow was felt also by leading nearby local foundries. Bison Casting Inc. was shut down for a week while Washington-Fillmore Foundry Inc. had its unit down for four days.

Chicago — Foundries in this district are taking some comfort from the fact that pig iron production has moved a notch higher with Interlake Iron Corp. relighting its relined Federal "B" blast furnace at South Chicago on Feb. 15. Of the district's 41 available furnaces, 39 are now in operation, but in spite of this iron supply remains far short of melting requirements of foundries. In late March or April, Youngstown Sheet & Tube Co. hopes to blow out its No. 1 stack at Indiana Harbor for replacement by a larger unit. The new stack has been built to one side and will be skidded onto the pad of the old furnace as quickly as the latter can be demolished.

Cincinnati—A high Ohio river flood stage, following stoppage of traffic thereon because of ice, created a severe pinch in coke supplies. However, most foundries had reserves adequate to continue melt at the level enforced by the curtailed tonnage of pig iron. Rail shipments of iron from northern and southern furnaces have been steady. Outlook for heavier allotments in the near future appear dim.

Birmingham — Pig iron supplies show no improvement. Steel mills generally are not suffering, but other industries will continue to suffer. Tennessee Coal, Iron & Railroad Co., this city, has started importation of considerable iron ore from Sweden and Brazil in an effort to bolster its production of steel.

TRIPLED Brush Life



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Iron Ore . . .

Iron Ore Prices, Page 140

Cleveland — Iron ore stocks at blast furnaces and Lake Erie docks declined to 29,081,189 tons as of Feb. 1, Lake Superior Iron Ore Association, this city, reports. Consumption during January totaled 7,056,667 gross tons.

If the January rate of consumption continues through February and March, stockpiles will have dwindled to less than 15 million tons by Apr. 1, when shipping may again be resumed. Stocks last year on Feb. 1 and Apr. 1 were 30,514,072 and 17,400,000 tons, respectively.

Early opening of the navigation season will be necessary if the low ore carryovers which have characterized the last several years are to be built up and if the expected increased 1948 ore requirements are to be met.

January consumption compares with 6,970,335 tons in December, and as of Feb. 1 two more American and Canadian furnaces were in blast than on Jan. 1, the total for the latest date being 180.

Wire . . .

Wire Prices, Page 139

Pittsburgh — Pittsburgh Steel Co. adopted the columnar system of pricing nails and staples, effective Feb. 20. In the change the company made price revisions reported to amount to an increase of around 90c to $1 a keg. The revisions included discontinuance of a 10 per cent discount on standard nail extras to jobbers. The company's base column at Pittsburgh is 114. This represents an increase of about $20 a ton above the company's previous price and a like amount above the balance of the market.

Birmingham—Anticipated improvement in wire products has not materialized. Some easing in nails has disappeared, probably due to a break in the weather and considerable repair activity. Already, a new insistence for wire fencing has set in, but supplies are not available in needed quantities. Jobbers continue what they describe as the best allocation system they can devise.

Scrap . . .

Scrap Prices, Page 144

Boston — With movement of steel scrap slightly heavier, prices with the exception of turnings, are generally at formula levels. Machine shop and short shovel turnings are selling up to $2 higher than usual differentials. Consumers of steelmaking scrap are more generally confident another upward surge in heavy melting in the near future is unlikely and this is contributing to activity. Cast prices, bolstered by strong demand and limited supply, are stronger on basis of $60 to $65 delivered for No. 1 cupola.

Philadelphia — While there are no important changes in steel scrap prices, the tone of the market is easier. Recent several days of mild weather, along with a general settling of the market to formula levels, has resulted in substantially heavier receipts at dealers' yards. As improved and more settled weather continues, receipts are expected to become still heavier. It would not prove too surprising as the spring season gets under way if formula levels are cut. There will be heavy demands as long as steel production continues high, but high rates have been maintained with a relatively meager supply of scrap and any real improvement in the flow of scrap may have a further easing effect on prices and a betterment in supply of pig iron. Contributing to this betterment should be the scheduled blowing in of the large new furnace at Sparrows Point late next month. Iron from this new furnace is believed to be earmarked largely for new steel finishing facilities, yet the scrap trade looks to it to ease the overall situation somewhat.

At present the major open-hearth grades are unchanged, although there is a slight reduction in machine shop turnings to a spread of $34 to $35, delivered. Cast grades are unchanged, although they may advance still further before a reaction sets in.

New York — Scrap is coming out more freely as a result of milder weather conditions, but is being absorbed readily by consumers. Meanwhile, scrap brokers' buying prices are unchanged. All open-hearth grades are on a formula basis, with turnings and low phos scrap in normal relationship. Cast grades continue strong.

Pittsburgh — Additional large tonnage of mill scrap purchases at formula prices were made last week, further bolstering the belief that scrap sellers have become reconciled to the fact that mills will not pay more than current prices for steelmaking grades. No. 1 cupola cast scrap prices continue strong with occasional sales reported at well above the present range of $59 to $60. Expected weakness in railroad specialties and malleable scrap has not developed.

Cleveland — Reflecting an easing in supply and price, shipments of steelmaking scrap are improving and prices on offerings of open market scrap are being held down to formulas.

With most of the severe winter weather past, the belief is held that the scrap flow will continue to improve, thereby helping to remove some of the buoyancy from prices. Considering other economic factors, such as the commodity market's recent performance and probable increases in receipts of foreign scrap, some observers are predicting scrap prices will drop 20 per cent this year.

However, an easing in the foundry scrap situation is not in immediate prospect, for demands in this field will be disproportionately high as long as the pig iron supply remains tight.

Buffalo — Although demand shows no immediate signs of easement, outside prices in the scrap market have been shaded slightly as additional sales of steelmaking grades took place at the mills' price formula. The latter prices are on the inside of ranges. Improvement was noted also in the movement of scrap. With dealers recognizing the formula bid of $39.75 for No. 2 heavy melting and bundles, the range on these items was narrowed to 50 cents compared with $1.25 previously. However, No. 1 material was still quoted at $42.50 to $44.50.

Confusion continues in the turnings market, but prices seem to be leveling off at somewhat lower levels. Machine shop turnings were quoted at $35.50 to $36, while short shoveling offerings were a dollar higher.

Detroit — While the three-week shutdown of Chrysler, Packard and scores of parts plants in this area because of a shortage of industrial gas reduced the movement of scrap appreciably, operations are now restored to normal, with the possibility of overtime being scheduled to make up the loss, and the flow of production scrap will be resumed shortly. On top of this a welcome break in the weath-

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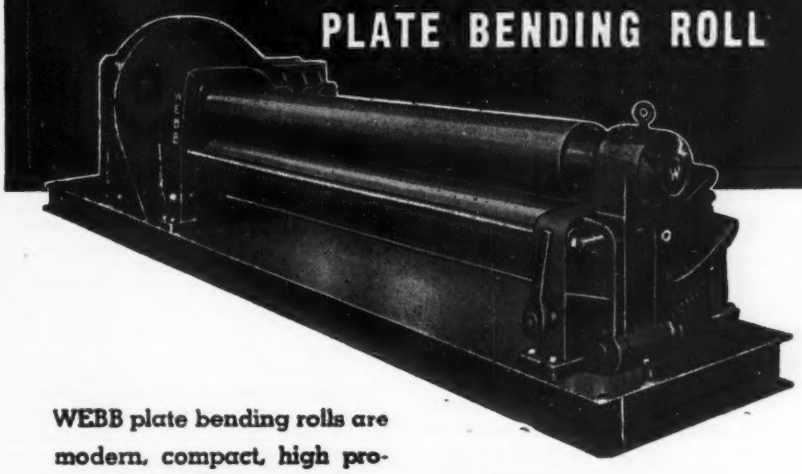

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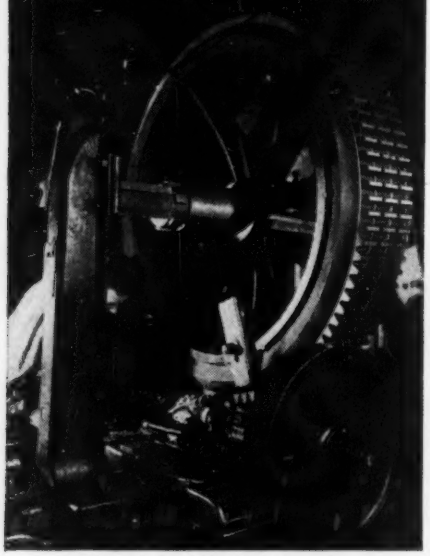

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er "unfreezes" much scrap which has been lying dormant. A Flint dealer says two days of sunshine floods his yard with new scrap.

Chicago—A decidedly easier tone prevails in the scrap market here. Having contracted for large tonnages the last two weeks, mills are buying sparingly. Fact that the recent purchases were made at $39.50 a ton delivered for heavy melting steel and the further fact that spring is close at hand dispel the possibility of higher prices in the near future. Scrap receipts by mills have been good, although there is a question as to whether brokers will be able to deliver all the tonnage to which they have committed themselves. Being well supplied, steel foundries are buying with caution, with consequence that railroad scrap prices have dropped markedly.

Seattle — No change in the steel scrap market is reported. The mill price continues firm at $24 but receipts no more than equal consumption so that inventories cannot be built.

Warehouse . . .

Warehouse Prices, Page 141

New York — Distributors are passing on advances in steel pipe prices and, in some cases, allocations for second quarter have been reduced 12 to 15 per cent. Coming at a time when pipe supply is already substantially below demand, this commodity becomes one of the tightest of steel products.

Another nail producer has increased prices which figures out close to $20 a ton higher.

Chicago — Warehouses are unable to improve their inventory position, requirements of customers exceeding volume of receipts from mills by an uncomfortable margin. Commodity and stock market declines recently have exerted no influence on lessening demand for steel. Flat-rolled products are desperately tight with lighter carbon bars a close second. Light structurals and plates are not available in quantities to accommodate customer demand.

Cincinnati — Warehouse sales are holding close to January levels, with scarce steel moving out as fast as received from mills. The pinch in sheets was never more severe, a feature of the demand being re-entrance into the market of some fabricators who heretofore had substituted aluminum. Shoppers seeking to pick up whatever is available and usable are on the increase.

Rails, Cars . . .

Track Material Prices, Page 139

New York—Domestic freight car awards in January involved 9213 cars, of which 3627 were placed with commercial shops and 5586 with railroad shops. The January total compares with 4218 in the preceding month, according to the American Railway Car Institute.

Backlogs as at the end of January showed little change, involving 119,711 cars, compared with 119,786 cars.

Birmingham — Chicago & Eastern Illinois has placed an order with Pullman-Standard Car Mfg. Co.'s Bessemer plant for 500 fifty-ton hoppers, delivery to start in March.

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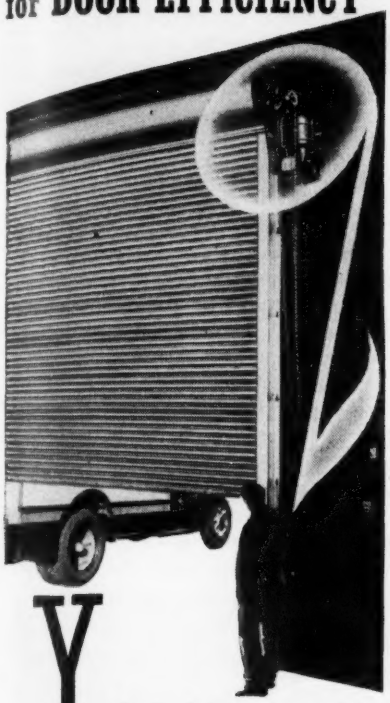

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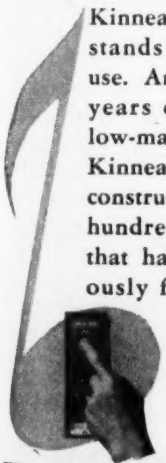

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Canada . . .

Toronto, Ont.—Although steel producers are maintaining schedules to the maximum of their raw material supply, they are making little headway toward equalizing supply and demand, and there seems no hope of achieving this objective during 1948. The iron and steel scrap shortage is reaching critical proportions and there is doubt in some quarters whether steelmakers will be able to get over the next three months without reducing operations owing to lack of scrap. For the past week or two offerings from domestic sources have been tapering off, and there are little prospects of improvement before next April or early May when something may be done to bring in supplies from the farm communities. Imported scrap has been the life-saver for the past several months and any substantial decline in imports could be reflected in reduced steel production.

Canadian steel prices are not keeping pace with those prevailing in the United States. While recent changes have been announced across the border, Canadian prices are unchanged at government ceiling levels announced last year. Canadian importers buying steel in the U. S., find their costs substantially higher than when ordering from domestic producers.

Demand for steel sheets is at a high level, and it is estimated available supply is sufficient to meet only about 50 per cent of current demand. Sheetmakers are booked solid on production to the end of first quarter and the majority will have a large carryover of unfilled orders into second quarter. Opening of books by producers for quarterly contracts appears to be largely a gesture of goodwill, as sheets, both black and galvanized, are allocated on a quota basis that is far short of meeting requirements.

Demand for steel plate is mounting rapidly, while supply for domestic use is declining. With Canadian railroad rolling stock builders reporting backlogs of orders sufficient to keep plants working at capacity well into 1949, demand for plate from this source has shown considerable improvement recently. Shipbuilders and other consumers also have been seeking larger tonnages. Canada's plate supply comes from two producers, Steel Co. of Canada Ltd., and Dominion Foundries & Steel, both of Hamilton, and production is said to be equal only to about 50 per cent of actual requirements at this time.

Southern Foundrymen Hold Conference

More than 300 southern foundrymen attended the 16th annual Foundry Practice Conference sponsored by the Birmingham District Chapter of the American Foundrymen's Association at the Tutwiler Hotel, Birmingham, Feb. 12-13. Technical discussions and plant inspections featured the two-day program. W. E. Jones, chief engineer, Stockham Pipe Fittings Co., Birmingham, and chairman of the Birmingham District Chapter, was chairman of the conference.

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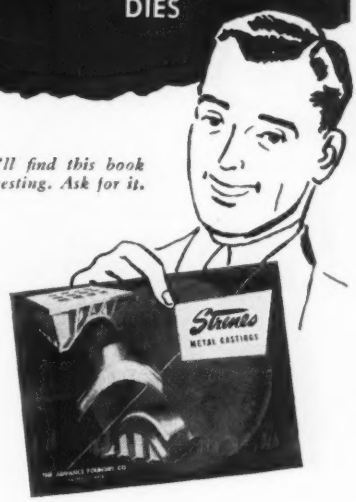

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AIME Considers New Techniques at Meeting

(*Concluded from Page 53*)

making it possible, he said, to use this element in promoting faster melts in the open hearth, thus cutting the time of operation which now runs from 11 to 14 hours.

An interesting paper on "Direct Oxidation in the Basic Open Hearth Process" was presented at this session by E. B. Hughes and F. G. Norris, Wheeling Steel Corp., Wheeling, W. Va. Another feature was a paper on "Kinetics of the Transfer of Sulphur Across a Slag Metal Interface," by Lo-Ching Chang, formerly with Metals Research Laboratory and now at the Massachusetts Institute of Technology, and Kenneth M. Goldman, research assistant, Metals Research Laboratory, Carnegie Institute of Technology.

Powder Metallurgy Discussed — Considerable discussion on powder metallurgy featured the Institute of Metals Division sessions. A paper on "Nickel Steels by Powder Metallurgy" was presented by Laurence Delisle, Sylvania Electric Products Co., Bayside, N. Y., and W. V. Knopp, research fellow, Stevens Institute of Technology, Hoboken, N. J.; "Magnetic Properties of Iron Powder Compacts" by Robert Steinitz, physicist, American Electro Metal Corp., Yonkers, N. Y.; "The Powder Metallurgy of Porous Metals and Alloys Having a Controlled Porosity," by Pol Duwez, associate professor of mechanical engineering, and H. E. Martens, research engineer, Jet Propulsion laboratory, California Institute of Technology, Pasadena, Calif.; and "Evaluation of the Molding, Coining and Sintering Properties of Iron Powder" by Jerome F. Kunick, manager, Metal Powder Department, Ekstrand & Tholand Inc., Carlstadt, N. J.

A powder metallurgy seminar was held on the mechanism of the sintering of two or more metals, with F. V. Lenel, assistant professor, metallurgical engineering, Renssalaer Polytechnic Institute, Troy, N. Y., serving as leader.

Metallography was discussed at another session, with five papers presented, and general miscellaneous subjects at another, also with five papers presented. Properties of metals were discussed at still another meeting and flow and fracture at another, with "The Influence of Strain Aging on the Fracture Stress of Low Carbon Steel," and "Development of Residual Stresses in Strip Rolling" among the papers presented.

Nonferrous Sessions—At the annual Institute of Metals Division dinner, William B. Warren, chief of design, R. Wallace & Sons, silversmiths, Wallingford, Conn., spoke on "The Queen of Metals." Two sessions were devoted to nonferrous metallurgy.

At a joint session of the Institute of the Pan American Institute of Mining Engineering & Geology, United States Section, reports were presented on magnesium carbonate deposits in Brazil, manganese in Mexico, mineral deposits in Colombia, mining industry in Latin America and the geology of Peru.

At a special meeting of Mineral Industries Educational Division it was revealed that the good demand for engineers that has existed since the war has resulted in a record current enrollment of a quarter million students in engineering schools of United States and Canada. However, more than the average four-year course in engineering was urged in many cases that men may be developed to think of mineral resources on a national and international scale — in other words, that men may be developed into "mineral statesmen."

Many Attend Milwaukee Foundry Conference

Nearly 600 members and guests attended the 11th annual regional foundry conference sponsored by the Wisconsin Chapter of the American Foundrymen's Association and the University of Wisconsin Feb. 12 and 13 at Hotel Schroeder, Milwaukee. The 22 sessions covered a wide range of topics dealing with problems in the steel, gray cast iron, malleable iron, nonferrous casting, and pattern fields. Hon. Frank B. Keefe, member of congress, sixth district, Wisconsin, spoke on "Foreign Relations" at the annual banquet.

Technical program was arranged under the direction of Walter W. Edens, Badger Brass & Aluminum Foundry Co. R. C. Woodward, Bucyrus-Erie Co., was chairman of the conference. R. J. Anderson, Belle City Malleable Co., is president of the Wisconsin Chapter.

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265 tons, new plant, Armstrong Furnace Co., Des Moines, to Pittsburgh Des Moines Steel Co., Pittsburgh; Weitz Co. Inc., Des Moines, contractor.

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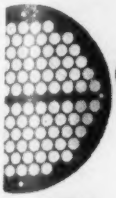

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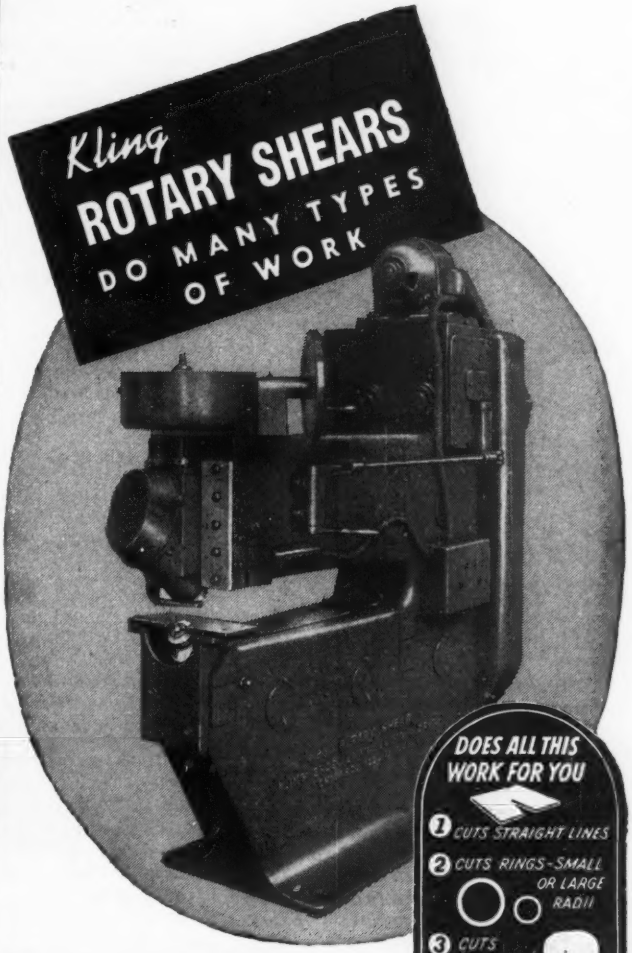

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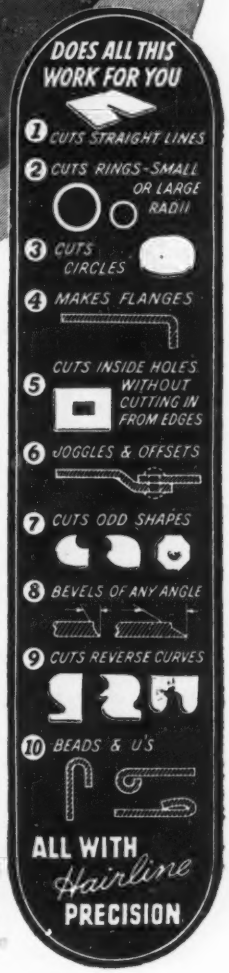
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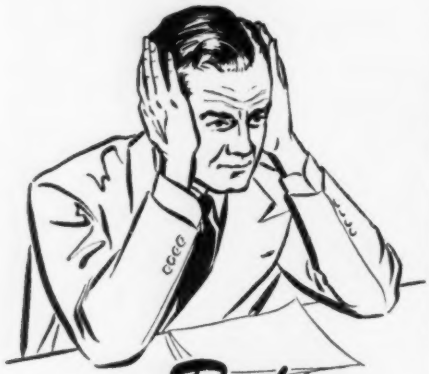

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200 tons, deck plate girder span, Chicago & North Western Railroad, Ames, Iowa, to American Bridge Co., Pittsburgh.

150 tons, building, Binks Mfg. Co., Chicago, to New City Iron Works, Chicago.

130 tons, new plant, Farley Mfg. Co., Skokie, Ill., to Duffin Iron Co., Chicago.

STRUCTURAL STEEL PENDING

1700 tons, sheet piling, flood wall, Omaha; bids to U. S. Engineer, Omaha, Feb. 18.

1600 tons, Pennsylvania Railroad bridge, Warren, Pa.; American Bridge Co., Pittsburgh, low.

1260 tons, bridge, No. 2938, Montezuma, Ind., for State Highway Department; Robert King, Danville, Ind., low on general contract; bids Feb. 17.

790 tons, bridge, Sec. TF-MFT, Whiteside county, Ill., for State Highway Department; American Bridge Co., Pittsburgh, low; bids Feb. 16.

770 tons, New Jersey state overpass and underpass, Route 26 extension, Section 1A, Trenton; bids postponed from Feb. 26 to Mar. 11.

525 tons, music building and auditorium, Rosary College, River Forest, Ill.; W. J. Lynch Co., Chicago, contractor.

365 tons, bridge and approaches, Baird Boulevard, Camden, N. J.; bids Mar. 9, state highway commission, Trenton; also 55 tons concrete reinforcing bars.

350 tons, veterans hospital, Wilmington, Del.; Virginia Engineering Co., Newport News, Va., low on general contract.

325 tons, school, Oak Lawn, Ill.; Duffin Iron Co., Chicago, low; bids Feb. 11.

275 tons, new plant, Vandercook & Sons, Chicago; bids Feb. 16.

200 tons, Claghorn public school, Philadelphia; bids asked.

200 tons, bus terminal, Chester, Pa.; bids Feb. 24.

130 tons, including 30 tons reinforcing, Washington state steel girder span, Pierce county; bids to Olympia, Feb. 27.

130 tons, including 20 tons reinforcing, Montana state bridge, Park county; bids to Helena Feb. 25.

100 tons, bridge and approaches, route 45, section 23, Camden county, New Jersey; bids Mar. 9, state highway commission, New Jersey; also 60 tons, reinforcing steel.

Unstated, superstructure, Similkameen bridge, Princeton, British Columbia; Western Bridge & Steel Fabricators Ltd., Vancouver, B. C., low, $112,525.

Unstated, $3 million veterans hospital, Spokane, Wash.; bids to U. S. Engineer Col. L. H. Hewitt, Seattle, Mar. 5.

REINFORCING BARS . . .

REINFORCING BARS PLACED

900 tons, veterans hospital, Iron Mountain, Mich., for U. S. Veterans Administration, to Joseph T. Ryerson & Son Inc., Chicago; Gust K. Newberg Construction Co., Chicago, contractor.

300 tons, including Hughes high school, and miscellaneous construction, to Bethlehem Pacific Steel Co., Seattle.

200 tons, superstructure, administration and engineering building, Standard Oil Co. of Indiana, Hammond, Ind., to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, miscellaneous construction projects in Washington state, to Northwest Steel Rolling Mills, Seattle.

100 tons, apartment, 229 West Upsal, Philadelphia, to American Steel Engineering Co., that city.

REINFORCING BARS PENDING

1900 tons, veterans hospital, Wilkesbarre, Pa.; Merritt-Chapman & Scott Corp., New York, low on general contract.

1335 tons, earthwork, lining and structures, Delta-Mondota canal, Central Valley project, near Tracy, Calif.; bids to Bureau of Reclamation, Denver.

1300 tons, veterans hospital, Wilmington, Del.; Virginia Engineering Co., Newport News, Va., low on general contract.

410 tons, warehouse, William Wrigley Jr. Co., Chicago; Ragnar Benson Inc., Chicago, low on general contract; bids Feb. 12.

375 tons, earthwork and structures, Missouri Basin project, near Cambridge, Neb.; bids to Bureau of Reclamation, Denver.

310 tons, Sinai Temple, Chicago; bids Feb. 19.

300 tons, bridge, Cumberland county, Ill., for State Highway Commission; bids Feb. 6.

250 tons, Hollywood Shores apartment, Chicago.

200 tons, superstructure, administration and engineering building, Standard Oil Co. of Indiana, Hammond, Ind.; bids Feb. 24.

150 tons, Claghorn public school, Philadelphia.

150 tons, bridge, Clay county, Ill., for State Highway Commission; bids Feb. 6.

115 tons, mesh, state highway, Palisades Interstate parkway, Englewood Cliffs, N. J.; bids Mar. 9, state highway commission, Trenton.

125 tons, Municipal building, Evanston, Ill., for city; bids Feb. 26.

Unstated, building, Mary Knoll College, Glen Ellyn, Ill.; bids Mar. 1.

Unstated, music building and auditorium, Rosary College, River Forest, Ill.

PLATES . . .

PLATES PLACED

Unstated, 3,900 ft. 24 and 26 in. water pipe to Vancouver Iron Works Ltd., Vancouver, B. C.; also 19,000 ft. 16 in. water pipe to Armco Drainage & Metal Products of Canada Ltd.; awards by Vancouver, B. C. Water Board, with escalator clauses and agreement to finish project by mid-1949.

PLATES PENDING

Unstated tonnage, 10 and 15-ft. diameter, welded plate pipe, and accessories, Bureau of Reclamation, Denver; Western Pipe & Steel Co., San Francisco, low, $2,189,600, spec. 1999.

PIPE . . .

CAST IRON PIPE PLACED

1390 tons, 8 and 12-in., also 109 tons water pipe specials, Washington, D. C., to Florence Pipe Foundry & Machine Co., Philadelphia.

CAST IRON PIPE PENDING

Unstated, 15,000 ft. water mains 4 to 12 in. and fittings; bids to Roy Barrett, city clerk, North Bend, Wash., with alternatives, Feb. 24; Parker & Hill, Seattle, engineers.

RAILS, CARS . . .

RAILROAD CARS PLACED

Atchison, Topeka & Santa Fe, 56 light-weight sleeping cars; 29 to American Car & Foundry Co., New York, and 27 to the Budd Co., Philadelphia.

Chicago & Eastern Illinois, 500 fifty-ton hopper cars, to Pullman-Standard Car & Mfg. Co., Chicago.

LOCOMOTIVES PLACED

Manila Railway Co., Philippine Islands, seven 4-8-2 type steam locomotives, to the Vulcan Iron Works, Wilkes-Barre, Pa.

LOCOMOTIVES PENDING

Louisville & Nashville, twenty-two 2-8-4 steam locomotives; bids asked.

RAILS PLACED

Chicago & North Western, 19,700 tons to Carnegie-Illinois Steel Corp., Chicago, and 5000 tons to Inland Steel Co., Chicago.

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CONSTRUCTION AND ENTERPRISE

ALABAMA

BIRMINGHAM—Alabama Metal Lath Co. has received a low bid of $122,000 from Dunn Construction Co., First National Bldg., for erection of two plant additions.

ARKANSAS

STEPHENS, ARK.—Berry Asphalt Co. plans to build a $275,000 addition to its warehouse and asphalt plant. Project also includes extensions to its crude oil and products pipe line, to cost about $175,000.

CALIFORNIA

BERKELEY, CALIF.—Pacific Paint & Varnish Co., Fourth and Cedar Sts., has awarded a $400,000 contract to Barrett & Hilp, 918 Harrison St., San Francisco, for a factory addition.

LOS ANGELES—Jiffy Excavator Tool Co. has been incorporated by Laurence Massa and associates with a capital of $1 million. Firm is represented by Hal R. Clark, 1018 Chapman Bldg.

LOS ANGELES—Crofton Diesel Engine Co. Inc. has been formed with a capital of $250,000 by William B. Crofton and associates. Firm is represented by Ekdale and Shallenberger, 614 S. Pacific Ave., San Pedro.

SAN JOSE, CALIF.—General Electric Co., 230 Montgomery St., San Francisco, has awarded a $1 million contract to Parker, Steffens & Pearce, 135 S. Park St., San Francisco, for construction of a motor manufacturing plant.

FLORIDA

JACKSONVILLE, FLA.—Florida Agricultural Supply Co. has awarded a contract to George D. Auchter for construction of a $450,000 manufacturing plant.

PANAMA CITY, FLA.—International Paper Co., John H. Hinman, president, has construction in progress on a $1,700,000 refining plant to be constructed by Arizona Chemical Corp. Facility will be owned jointly by International Paper and American Cyanamid Co.

GEORGIA

ATLANTA—Georgia Power Co., 75 Marietta St. N. W., has awarded a $300,000 contract to Van Winkle & Co., Whitehead Bldg., for construction of a trackless trolley repair and storage garage.

ILLINOIS

CHICAGO — American Electric Fusion, 2610 Diversey St., has awarded a $125,000 contract to Olsen & Voss, 311 Pulaski Rd., for construction of a 1-story factory.

CHICAGO — United Mfg. & Service, 5737 Broadway, has awarded a contract to Enjay Construction Co., 105 W. Madison St., for erection of a 1-story factory.

DEERFIELD, ILL.—Tractomotive Corp., Hillside, has awarded a contract to R. G. Regan Co., Joliet, for construction of a 1-story factory and office to cost $150,000.

EAST ST. LOUIS, ILL.—Baltimore & Ohio Railroad will construct facilities here costing $223,000 for servicing diesel engines. Local installation is part of a $425,000 program which includes construction of similar facilities at Washington, Ind., Cincinnati and Parkersburg, W. Va.

INDIANA

TERRE HAUTE, IND.—Commercial Solvents Corp., Henry E. Perry, president, will expand its research and development department here at a cost of $2 million.

KANSAS

MC PHERSON, KANS.—Bay Petroleum Corp. has awarded a $145,000 contract to Refinery Engineering Co. for construction of a thermal reformer unit with capacity of 1000 bbl daily.

SUN CITY, KANS. — National Gypsum Co., 325 Delaware St., Buffalo, has awarded a $1,150,000 contract to Baltimore Construction Co., 711 S. Central Ave., Baltimore, for erection of two plants, one here and one at Medicine Lodge.

KENTUCKY

ASHLAND, KY.—American Rolling Mill Co., Middletown, O., has awarded a contract to Arthur G. McKee Co., 2300 Chester Ave., Cleveland, for construction of a $1 million iron ore processing pilot plant to convert magnetic taconite and iron-bearing rock into ore suitable for existing blast furnaces here.

DEANE, KY.—Consolidation Coal Co., Pittsburgh, plans construction of tipple on new Rockhouse branch of L & N Railroad. Cost will be $600,000, including equipment.

WHITESBURG, KY.—Stoker Coal Co., M. K. Marlowe, general manager, will build a tipple, headhouse, conveyor, screen apparatus and other accessories at a cost of $150,000.

LOUISIANA

BATON ROUGE, LA.—Ethyl Corp. has received the low bid of $622,960 from Caldwell & McCann, Triad Bldg., for construction of a development laboratory and pilot plant.

MICHIGAN

DETROIT — Schaefer Screw Products Co., 18150 W. Chicago, has been formed by Andrew Miller with a capital of $100,000 to make brass or other metal fittings, tubing and parts.

GRAND RAPIDS, MICH.—Oliver Machinery Co., 1025 Clancy N. E., has been formed by Melvin D. Baldwin with a capital of $1,250,000 to engage in a foundry and machine shop business.

JACKSON, MICH.—Casalbi Co., 540 Wayne, has been formed by Clifford M. Sparks with a capital of $300,000 to manufacture machinery.

WHITEHALL, MICH.—Spun Castings Corp., Lewis Ave., has been formed by Ira J. Lyons with a capital of $200,000 to engage in a foundry business.

MINNESOTA

LYLE, MINN.—Dairyland Power Co-operative, 407 Rivoli Bldg., La Crosse, Wis., plans a $500,000 power plant improvement project to include a new building and two 2500 kw diesel engines.

NEW JERSEY

NEWARK, N. J.—E. I. du Pont de Nemours & Co., 256 Vanderpool St., has awarded a $200,000 contract to E. M. Waldron & Co., 84 S. Sixth St., for construction of a factory addition.

OHIO

DOVER, O.—L. W. Nash Co., East Palestine, O., maker of rolling mill equipment, has negotiations pending for purchase and remodeling of old American Sheet & Tin Plate Co. buildings here now owned by city of Dover. Remodeling would cost $100,000.

TOLEDO, O. — Air-Way Electric Appliance Corp. Joseph N. Nuffer, president, 2101 Auburn Ave., plans a $100,000 project to include two buildings.

YOUNGSTOWN—Youngstown Sheet & Tube Co. has appropriated an additional $4 million for an increased construction and plant expansion program.

PENNSYLVANIA

HARMARVILLE, PA.—Gulf Research & Development Corp., Gulf Bldg., Pittsburgh, has awarded a $920,000 contract to George Seaman Co., 5145 Liberty Ave., Pittsburgh, for construction of a 2-story geophysics laboratory.

HATBORO, PA.—Pennsylvania Rivet & Machine Co., Third and Huntingdon Sts., has awarded a $250,000 contract to William F. Lotz, 4700 Frankford Ave., Philadelphia, for construction of a 1-story factory.

LANCASTER, PA.—Radio Corp. of America, New Holland Pike, will build a $400,000 plant here. Frank J. Sleeter, Front and Cooper Sts., Camden, N. J., is owner's general plant engineer.

LANCASTER, PA. — Armstrong Cork Co., Liberty and Mary Sts., has received the low bid of $500,000 from Hughes Foulkrod Co., Schaff Bldg., Philadelphia, for construction of a research laboratory.

MIDLAND, PA.—Crucible Steel Co. of America has awarded a contract to Rust Engineering Co., Pittsburgh, to install two boilers built by Babcock & Wilcox. Project is expected to cost $800,000.

TEXAS

BROWNWOOD, TEX.—Texas Power & Light Co., Interurban Bldg., Dallas, will build an electric power plant at a cost of $800,000.

HOUSTON, TEX.—Croft Steel Products Inc., Joseph C. Brancroft, president, Jamestown, N. Y., will build a $500,000 assembly plant to produce steel casement windows. Future plans call for construction of a $1 million manufacturing plant.

LONGVIEW, TEX.—Southwestern Gas & Electric Co., 428 Travis St., Shreveport, La., will build a 50,000 kw electric generating plant near here at a cost of $3,250,000.

MARSHALL, TEX.—Texas & Pacific Railway, R. J. Gammie, chief engineer, Texas & Pacific Bldg., Dallas, will expand its maintenance shop at a cost of $100,000.

TEXAS CITY, TEX.—Tin Processing Corp., Alexander Ter Braake, president, has awarded a contract to Chemical Construction Corp., 30 Rockefeller Plaza, New York, for erection of a $2,700,000 chemical plant designed for reclamation of hydrochloric acid and silver.

WACO, TEX.—General Tire & Rubber Co. L. A. McQueen, vice president, Akron, has begun a $200,000 expansion program here. Firm also plans enlargement of its Baytown synthetic rubber manufacturing plant.

UTAH

IRONTON, UTAH—Kaiser-Fraser Corp., Willow Run, Mich., will spend $2 million in reconverting a surplus blast furnace, sintering plant and 500 coke ovens it recently purchased from WAA.

SALT LAKE CITY, UTAH—Chicago Bridge & Iron Co. reports that work has been started by Olsen Construction Co. on its $175,000 steel fabricating plant near here.

WASHINGTON

GRAND COULEE, WASH. — Westinghouse Electric Co., Pittsburgh, has submitted the sole bid, totaling $5,328,000, for three additional 108,000-kw generators for the east powerhouse of Grand Coulee dam.

SEATTLE — Great Northern Railway has awarded a $1 million contract to Morrison-Knudsen Co. Inc. to relocate part of its main line in the Cascade mountains.

SEATTLE — Sundfeldt Equipment Co., 220 Hudson St., plans a project including shop buildings and a warehouse. Cost will be $150,000.

SPOKANE, WASH.—Empire Chemical Corp., Butte, Mont., will build a $750,000 phosphate fertilizer plant near here.

TACOMA, WASH. — Washington Steel Products Co., Seattle, has acquired a 4-acre site here and will build a plant expected to be ready by June 1. Operations will be moved from Seattle.

TRENTWOOD, WASH. — Permanente Metals Corp., Oakland, Calif., has begun construction on an aluminum research laboratory here adjacent to its aluminum rolling mill.

WISCONSIN

MILWAUKEE—Pittsburgh Plate Glass Co., 235 E. Pittsburgh Ave., has awarded a $650,000 contract to Hunzinger Construction Co., 4541 N. 124th St., for construction of a 5-story factory addition.